

THE D. A. TOMPKINS COMPANY

Catalogue "F"



Cotton Mills
Acid Phosphate Works
Sulphuric Acid Chambers
Cotton Seed Oil Mills
Cotton Oil Refineries
Modern Cotton Ginneries
Steam Power Plants

Electric Light and Power
Plants
Sprinklers and Fire Protection
Steam and Hot Water
Heating
High Pressure Steam Piping
Roll Covering

ENGINES BOILERS
PUMPS ETC.

CHARLOTTE, NORTH CAROLINA
U. S. A.

1904



Class TJ 1175

Book J66

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T h e
D. A. Tompkins
: Company :

MANUFACTURERS, ENGINEERS AND CONTRACTORS

Dealers in Wrought Iron Pipe, Fittings,
Valves, Machinery and Electrical Supplies

Cotton Seed Oil Mills : Acid Phosphate
Works : Sulphuric Acid Chambers :
Steam Power Plants : Modern Cotton
Ginneries : Electric Light and Power
Plants : Cotton Factories : Sprinklers
and Fire Protection : Cotton Oil Re-
fineries : : : : :

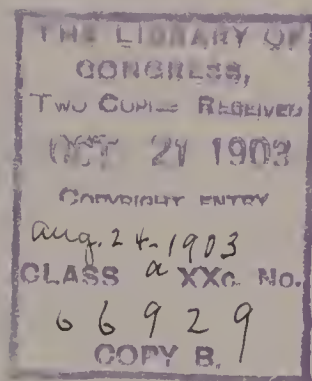
STEAM AND HOT WATER HEATING FOR
Manufacturing Plants, Public Buildings,
Private Dwellings, Etc. : : : :

HIGH PRESSURE STEAM PIPING A SPECIALTY
MACHINE AND REPAIR WORK
OF ALL DESCRIPTIONS : :

Cylinders and Crank Pins Bored and
Turned in Place : : : :

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by
The D. A. Tompkins Co.

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PREFACE.

THE business of this company has so developed, in volume and diversity, that it becomes necessary to issue an illustrated catalogue to show the products of our shops and foundry and some of the machines and supplies which are carried in stock.

The business was originally founded upon the labors of one man working as a machinist. The first augmentation of it was the sale of some machinery on commission. Then followed some contract work on a small scale. Then a little engine and a few machine tools were put into a hired room. Then came the making of engineering plans for cotton seed oil mills, cotton mills and other industrial works, and the making of contracts to build these complete or to equip the buildings with machinery and appliances complete.

Meanwhile our shops (machine, pattern, and forge), continued to grow. The business outgrew the hired building we were in (200 feet long and 3 stories high), and we were compelled to erect a new building (200 feet by 4 stories and wider than the old one), where we are now lodged. We have also built a foundry for making castings for our own shop and for others also.

THE D. A. TOMPKINS Co.





Figure 1.

Our New Shops and Offices.

ADVICE TO CUSTOMERS.

1. Give specific description and always order by catalogue page and number when it is given. Avoid ordering goods "same as last."

2. State distinctly how the goods ordered are to be shipped, whether by FREIGHT, EXPRESS OR MAIL. If any special route is preferred, it should be mentioned on the order, otherwise, we will use our best judgment.

3. Orders are filled promptly, and great care is used in properly packing goods—especially glassware—and obtaining receipts from carriers for delivery in GOOD CONDITION. We cannot, therefore, be responsible for goods damaged or lost in transportation. All possible precautions, however, will be used to prevent injury or delay, and if requested, shipments will be traced.

4. All CLAIMS concerning shipments must be made within FIVE DAYS of the receipt of the goods, and should be accompanied by the PACKING SLIP, which is forwarded with each shipment.

5. When referring to orders, always give the NUMBER OR DATE of your order as well as the name of the CONSIGNEE of the goods.

6. When request is made to return material, or credit claimed for overcharge or allowance, the date of our INVOICE must be given.

7. Do not return material of any kind without first communicating with us and obtaining, 1st, our approval for returning goods, and 2d, the proper shipping directions.

8. All returned goods must be plainly marked with the NAME and ADDRESS of the sender, and proper notification of shipment, with copy of shipping receipt, must be sent us.

9. Prices are subject to change WITHOUT NOTICE, and it is understood that this company will in no way be held responsible for such changes.

10. All prices are listed at POINT OF SHIPMENT. Charges for BOXING and PACKING will be made in accordance with our regular custom.

11. Cuts of machines shown are from patterns in use at the time this catalogue is published. If later, patterns are changed, we reserve the right to ship the latest pattern.

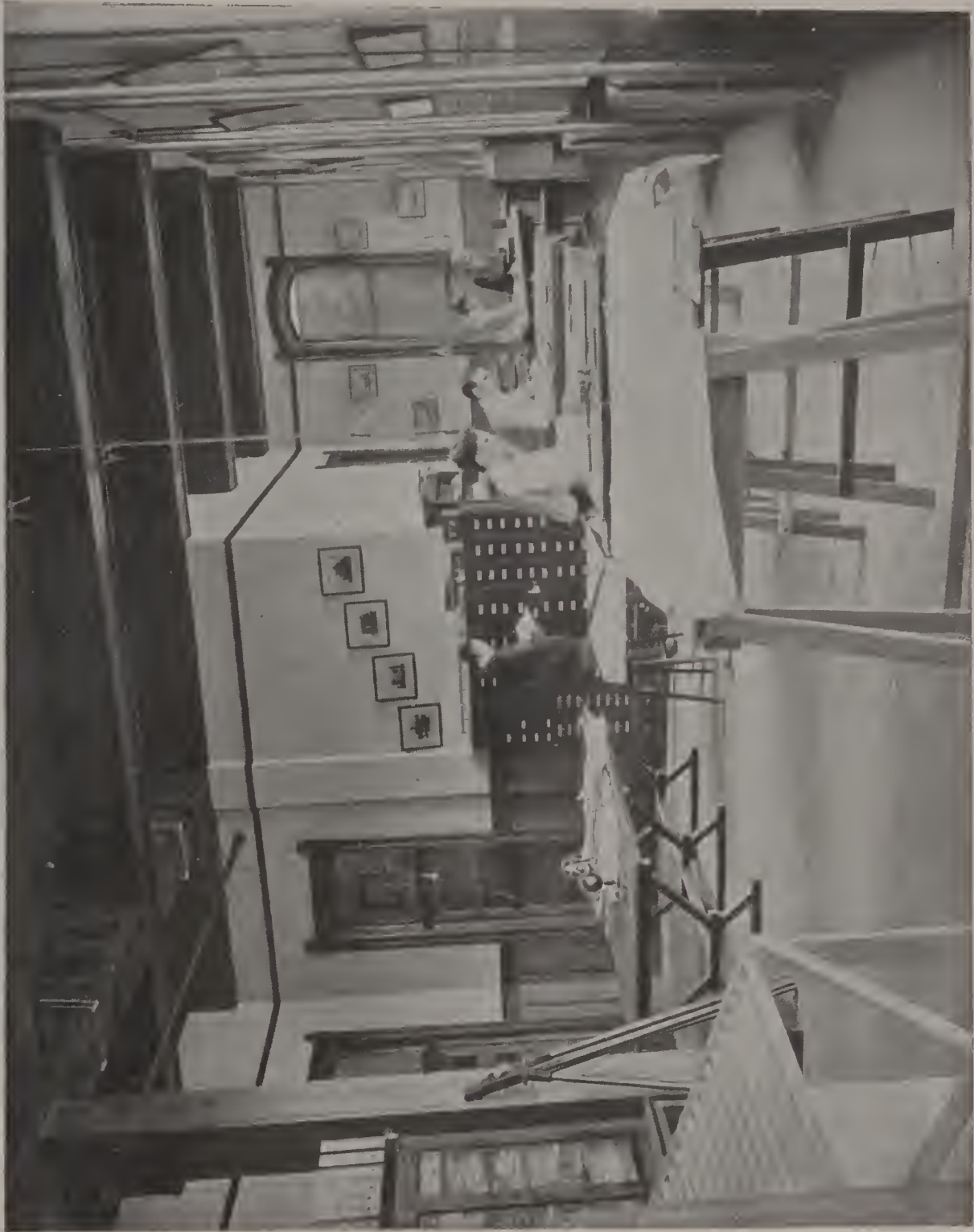


Figure 2.
Draughting Room in Our Engineering Department.

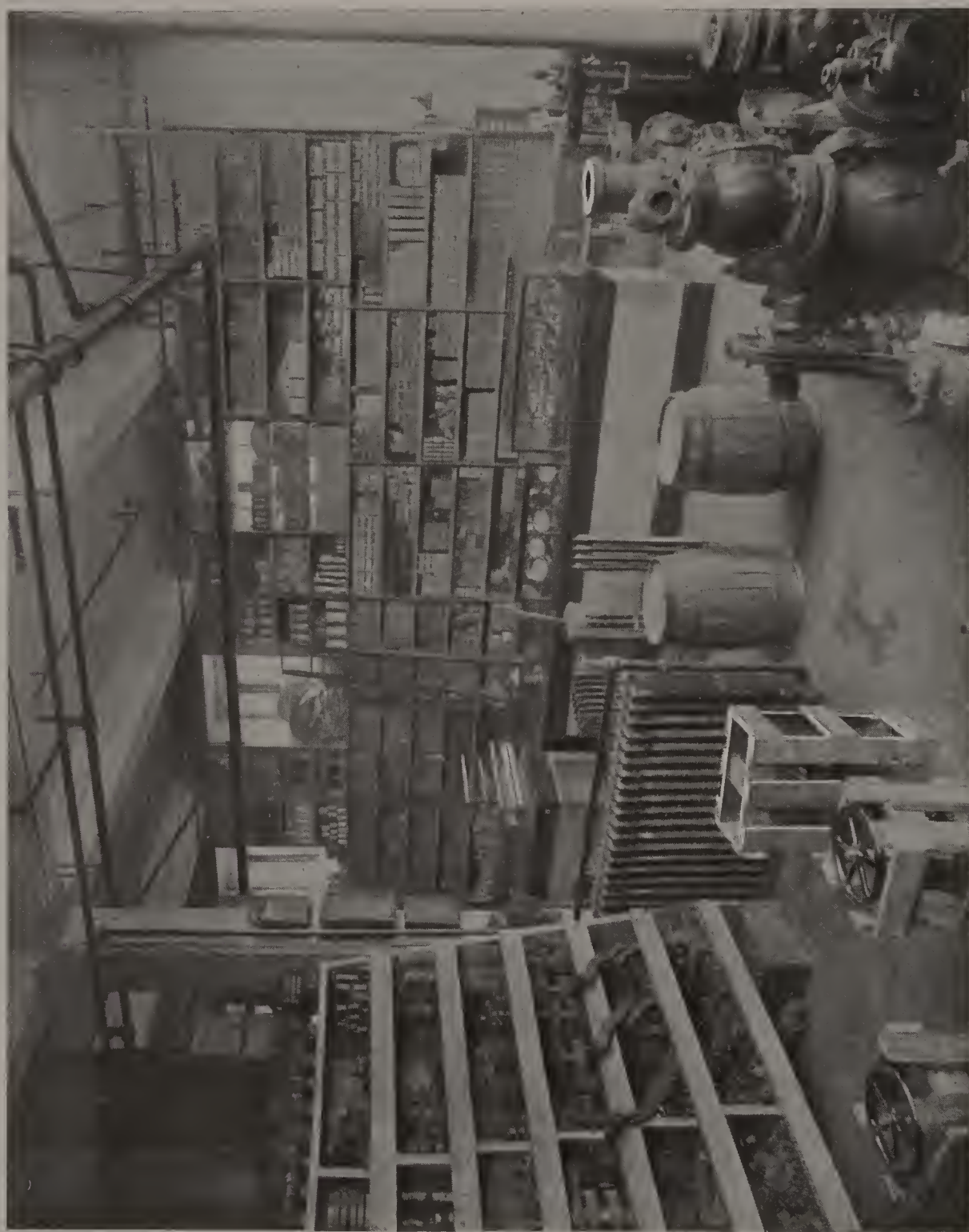


Figure 3.
A Corner of our Supply Room.
(Electrical Goods.)



Figure 4.
A Corner of our Supply Room.
(Pipe Fittings, Valves, etc.)



Figure 5.
A Portion of our Machine Shop.



Figure 6.

A Corner of our Roll Covering Department.

We make rolls and cover rolls.

We make cots.



Figure 7.
Our Foundry.

The D. A. Tompkins Company

Charlotte, N. C.

ENGINEERING AND CONTRACTING

Cotton Seed Oil Mills

Steam Power Plants

Cotton Oil Refineries

Modern Cotton Ginneries

Acid Phosphate Works

Electric Light and Power Plants

Sulphuric Acid Chambers

Cotton Factories

Sprinklers and Fire Protection

Industrial development in the United States has reached a point where the success of any enterprise hinges upon bringing to bear upon the construction of a plant the accumulated knowledge and experience of the best men in special lines of manufacture.

This can only be done through intelligent Engineers, sufficiently educated to entitle them to be considered professional men, and who make the accumulation of this knowledge, and data determined by experience, a special study.

TEXTILE SCHOOLS

Designed by The D. A. Tompkins Company.



Figure 8.
Textile Building, Clemson College, S. C.

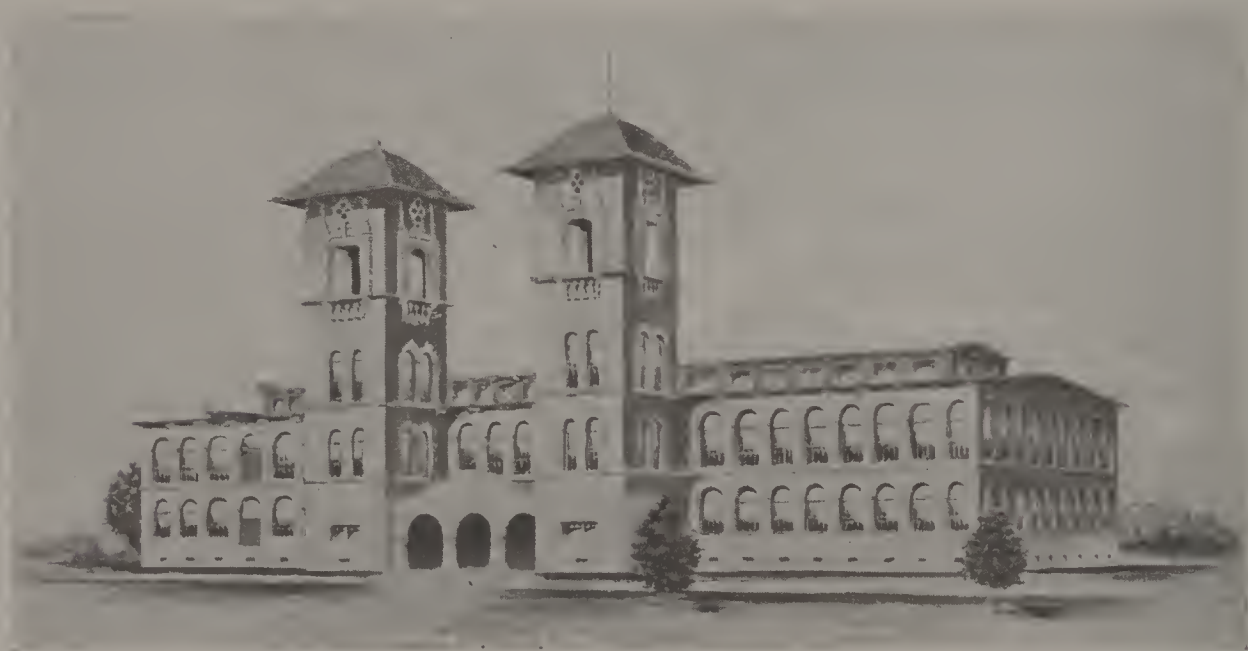


Figure 9.
Textile Building, A. and M. College, Miss.



Figure 10.
Textile Building, A. and M. College, N. C.



Figure 11.
The High Shoals Co., High Shoals, N. C.,
Cotton Mill.

Designed by The D. A. Tompkins Company.



Figure 12.
Highland Park Manufacturing Co., Gingham Mills, Charlotte, N. C.
Designed by The D. A. Tompkins Company.



Figure 13.
Edgefield Manufacturing Company, Edgefield, S. C. Cotton Mills.
Designed by The D. A. Tompkins Company.



Figure 14.
Edgefield Manufacturing Company, Oil Mill, Fertilizer Factory and Cotton Ginnery.
Designed by the D. A. Tompkins Company.



Figure 15.
General View 150-Ton Oil Mill.

Designed by The D. A. Tompkins Company.



Figure 16.
General View 100-Ton Oil Mill.

Designed by The D. A. Tompkins Company.

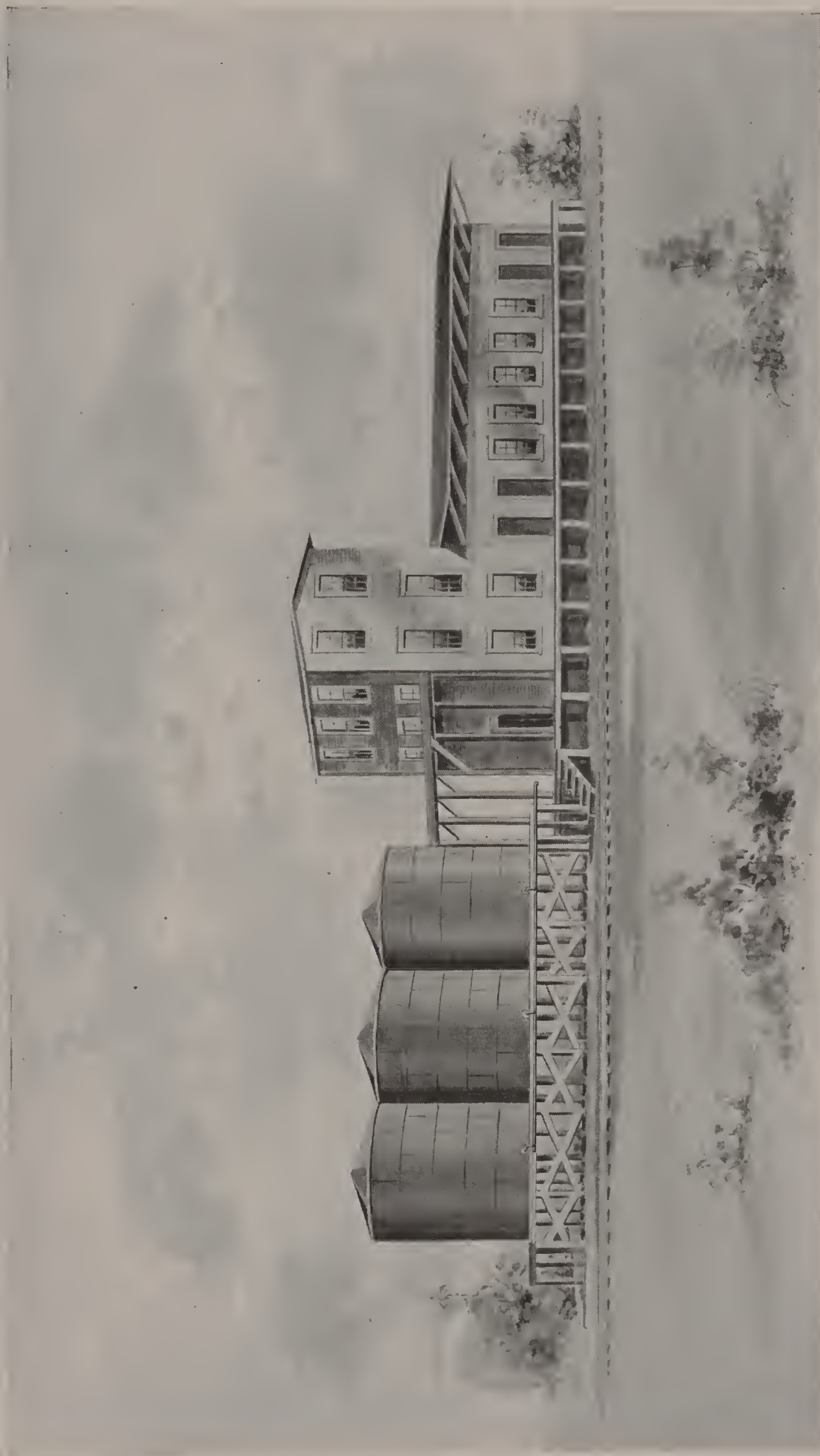


Figure 17.
General View of Cotton Oil Refinery.

Designed by The D. A. Tompkins Company.



Figure 18.
Southern Phosphate Works.
(Fertilizer Plant.)

The D. A. Tompkins Company

Charlotte, N. C.

BOILERS, ENGINES AND
APPURTENANCES

We Make Contracts for Installation of Complete Steam Plants

Machine and Repair Work of Every Description

Grate Bars and Other Castings

STANDARD RETURN TUBULAR BOILERS.

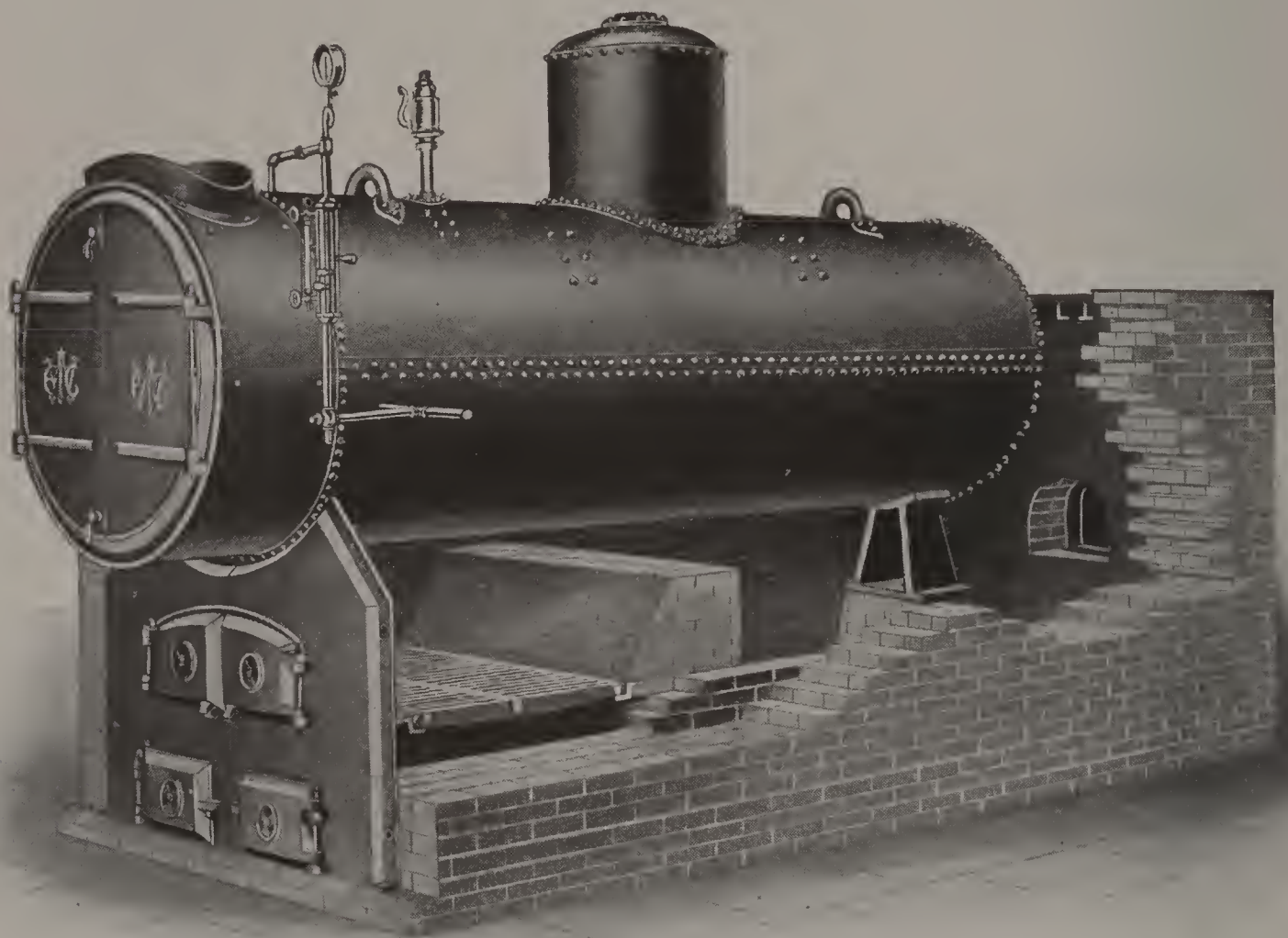


Figure 19.

Open Hearth Homogeneous "Flange" Steel.

Horizontal Return Tubular Stationary Boiler.

Specifications.

Number of Size.	1	2	3	3½	4	5	6	7	7½	8	9	10	10½	10¾	11	12	13	14	15	15½	16	17	18	19
Horse-Power, as usually rated.....	10	12	15	20	25	30	35	40	44	48	54	60	65	60	60	70	80	90	100	110	125	150	175	200
Diameter of Boiler.....inches	30	30	36	36	42	44	44	44	48	48	54	54	54	54	60	60	60	66	66	66	72	72	78	84
Length of Tubes used.....in feet	7	8	8	10	10	10	12	14	14	12	14	12	15	16	12	14	16	15	16	18	18	18	18	18
Number of Tubes, 3-in. diameter.....	20	20	28	28	38	46	46	46	52	52	64	64	64	64	82	82	44-4"	54-4"	54-4"	54-4"	70-4"	70-4"	88-4"	108-4"
Length of Grates.....inches	36	36	36	42	48	42	48	48	54	48	54	48	54	54	48	54	54	54	54	60	54	60	60	60
Diameter of Dome.....	18	18	20	20	22	22	22	22	24	26	26	30	30	30	32	32	32	36	36	36	36	36	36	36
Height of Dome.....	20	20	22	22	24	24	24	24	24	28	28	34	34	34	36	36	36	40	40	40	40	40	40	40
Mean { Shell	1¼	1¼	1¼	1¼	1¼	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
Thicknesses { Main Heads..	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
{ Dome Shell ..	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
{ Dome Head..	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
Diameter of Smoke Stack.....	14	14	16	16	16	20	22	22	22	24	24	26	26	26	28	28	28	30	30	30	34	40	44	44
Length of Smoke Stack.....in feet	28	28	28	35	40	35	40	40	50	40	50	40	50	60	40	50	60	60	60	60	60	60	60	60
Weight of Boiler and Britchen..about	1900	2300	2600	2900	3400	4000	4300	4900	5500	6000	6800	7000	8200	8600	9000	9900	11000	12700	13000	14700	16000	17300	21000	25000
Weight of Boiler Fixtures.....	1500	1600	1700	1950	2200	2500	2600	2700	3000	3400	3500	3600	3800	3800	4000	4500	5000	5000	5000	5000	6000	6200	7000	8000
Weight of Boiler and Fixtures..about	3400	3900	4300	4850	5350	6500	6900	7600	8500	9400	10300	10600	12000	12400	13000	14400	16000	17700	18000	19700	22000	23500	28000	33000
Weight of Flush Ended Boiler, with four Wall Brackets.....about	1800	2200	2500	2800	3300	3900	4300	5000	5500	5700	6500	7000	8000	8400	8600	9700	10500	12000	13000	14700	16000	17400	21000	24700
Weight with Full-Front Fixtures..about	4400	4900	5300	5800	6500	7700	8400	9000	10000	10200	11500	12000	13500	13900	14500	16000	17000	19000	20000	21700	24000	25000	30000	35000

Number of 3, 3½ and 4 inch Tubes For Above Boilers.

Number of Size	1	2	3	3½	4	5	6	7	7½	8	9	10	10½	10¾	11	12	13	14	15	15½	16	17	18	19
No. of 3-inch Tubes, Man-hole in front Head below Tubes, no Hand-hole	16	16	20	20	20	30	38	38	38	44	44	54	54	54	72	72	72	88	88	88	110	....	....	....
No. of 3½-inch Tubes, Hand-hole in each Head below Tubes.....	16	16	20	20	20	28	34	34	34	40	40	48	48	48	64	64	64	82	82	82	104	....	....	....
No. of 3½-inch Tubes, Man-hole in front Head below Tubes, no Hand-hole	....	....	18	18	18	26	30	30	30	36	36	42	42	42	56	56	56	70	70	70	88	....	....	....
No. of 4-inch Tubes, Hand-hole in each Head below Tubes.....	....	....	....	....	....	22	28	28	28	34	34	42	42	42	54	54	54	64	64	64	84	....	....	....
No. of 4-inch Tubes, Man-hole in front Head below Tubes, no Hand-hole	....	....	....	....	....	....	24	24	24	28	28	32	32	32	44	44	44	54	54	54	70	88	....	108

HORIZONTAL RETURN TUBULAR STATIONARY BOILER.

Regular Boiler Fixtures.

Half-Arch Front,
Anchors for Front,
Stand for Rear End of Boiler,
Grates,
Grate Bearer,
Rear Arch Bar,
Rear Ash-Door and Frame,
Smoke Stack,

Safety Valve,
Steam Gauge with Siphon,
Water Gauge with Stand-pipe fitted to
Boiler,
Three Gauge Cocks,
Blow-off Cock,
Check Valve,
Stop Valve.

Galvanized Wire Rope Guys (six times the length of stack).

Wall brackets are not furnished with Half-Arch Front Boilers.

44-inch diameter and smaller boilers are without loops; 48-inch and 54-inch diameter have two loops; 60-inch diameter and larger, four loops.

When a boiler is ordered "as per list," we understand that Half-Arch Front fixtures as above are wanted. No. 19 has a special front.

Full-Arch Front Fixtures.

Full-Arch Front,
Anchors for Front,
Oval Stack Plate,
Grates,
Grate Bearer,
Rear Arch Bars,
Rear Ash-Door and Frame,
Smoke Stack,

Safety Valve,
Steam Gauge with Siphon,
Water Gauge with Stand-pipe fitted to
Boiler,
Three Gauge Cocks,
Blow-off Cock,
Check Valve,
Stop Valve.

Galvanized Wire Rope Guys (six times the length of stack).

Four Wall Brackets, but no loops, are furnished with Full-Arch Front Boiler.

No. 19 has a special front.

Wall plates and rollers, and binding bars and rods are all subject to order, and are charged extra.

The width of the grate surface in all cases equals the diameter of the boiler.

Sawdust grates, six inches longer than regular, will be substituted for the regular grates, when ordered, without extra charge.

Nos. 1 to 3¾ inclusive have hand-hole in each head below tubes, but no man-hole in boiler.

No. 4 to 9 inclusive have hand-hole in each head below tubes, and man-hole in front head over tubes.

Nos. 10 to 12 inclusive have hand-hole in each head below tubes, and man-hole in rear head over tubes.

Nos. 13 to 19 inclusive have man-hole in front head below tubes, and man-hole in rear head over tubes.

All steam openings 2½ inches and larger are reinforced with a flange.

All smoke stacks up to and including 28 inches in diameter are No. 16 gauge; 30 inches, 32 inches and 34 inches in diameter of No. 14, and 36 inches and larger of No. 12; if heavier gauge is required, a proportionate charge will be made.

When two or more boilers, up to No. 7½ in size, are placed in a battery and designed to run separately, the fronts, smoke connection, etc, are arranged for a 16-inch division wall; boilers up to No. 10¾, 20-inch and larger sizes, 24-inch division wall. Any deviation from the above must be noted in order.

NOTE.—Any change in the length of boilers necessitates a change in the length of grates, making them correspond in length to grates used under boilers having same length of tubes.

Proper credit or charge to be made for this change.

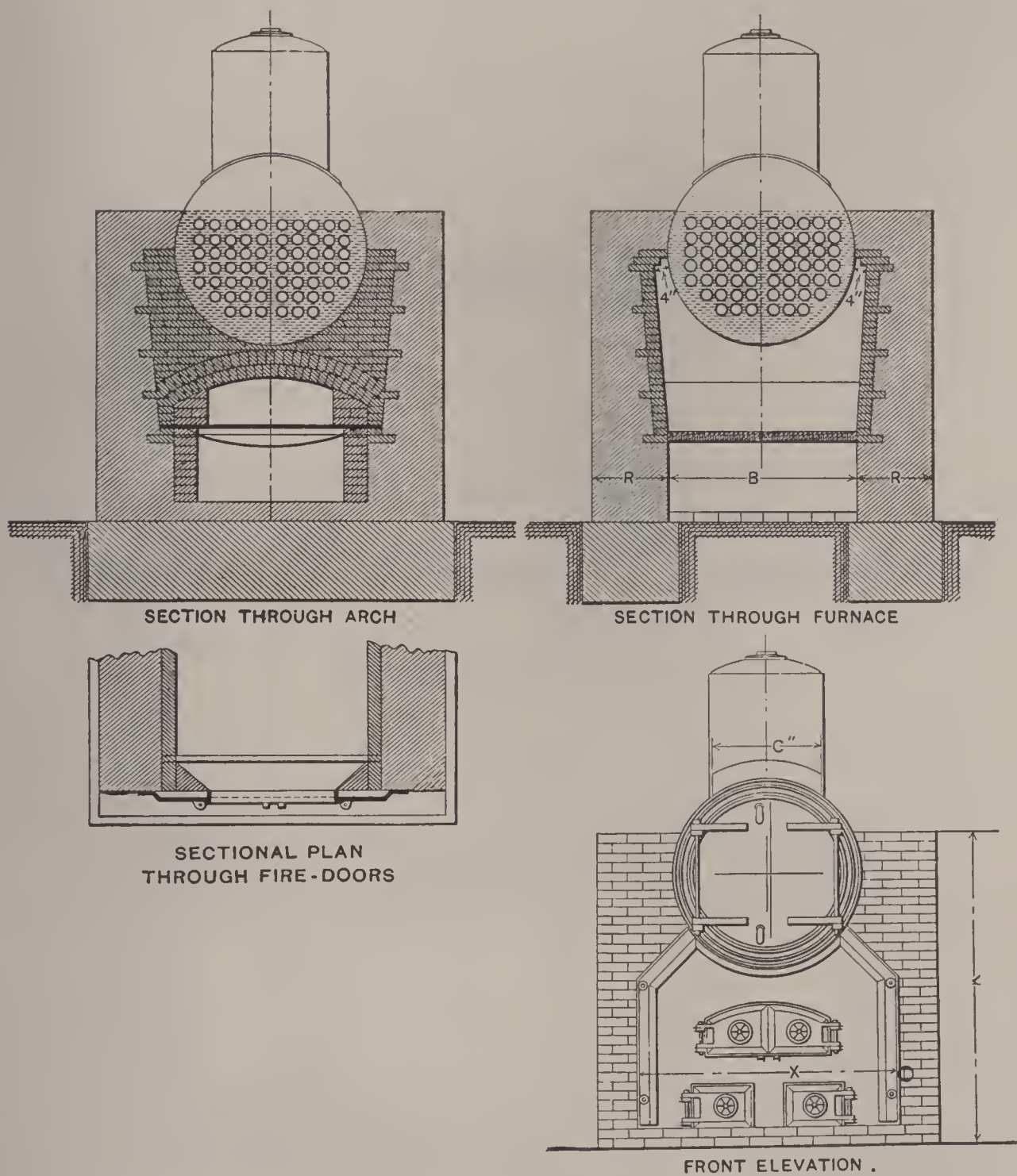


Figure 20.

Setting for Stationary Half-Arch Front Boilers.

In setting Stationary Boilers the side walls should be so built that the longitudinal seams of the shell will be protected from the fire.

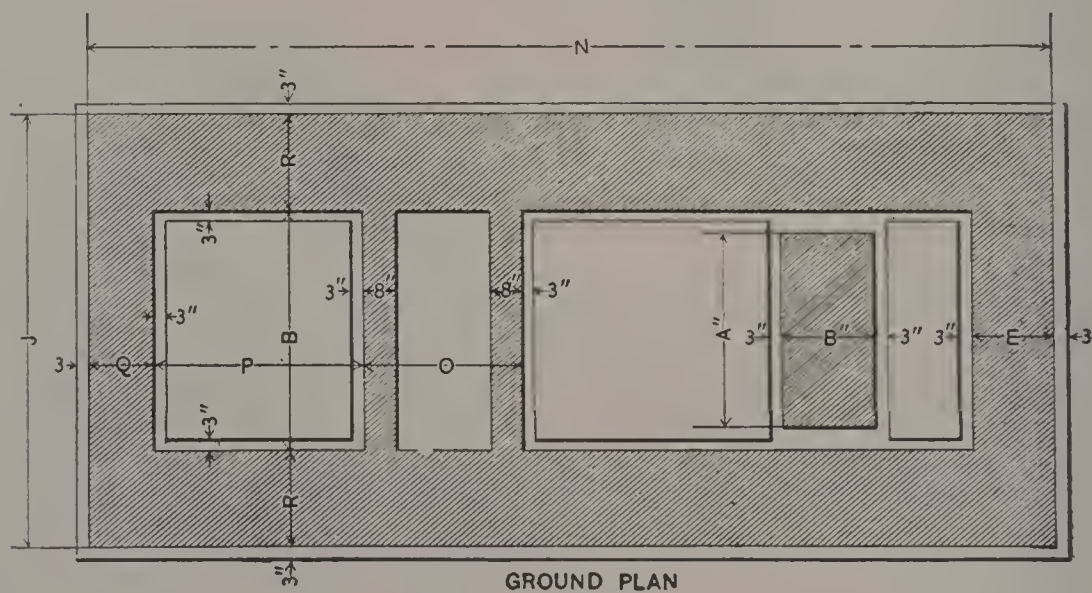
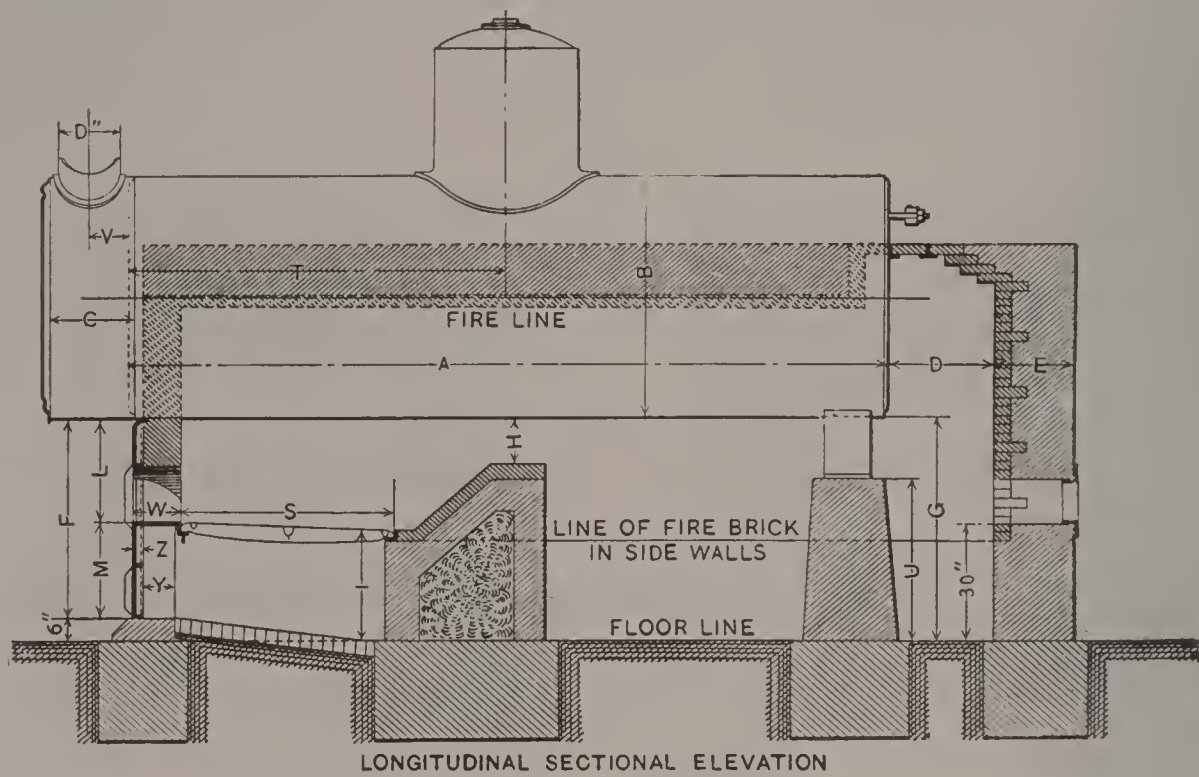


Figure 21.
Half-Arch Boiler.

Measurements for Setting Stationary Boilers with Half-Arch Fronts.

Reference Letters on Diagrams Figs: 20-21.

No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A"	B"	C"	D"	Size of Fire-Door Opening	Size of Each Ash-Pit Door Opening	Fire Brick	Common Brick	No.
1	7	30	14	20	16	44 1/2	49 1/2	7	24	62	65 1/2	24 1/2	20	10-3	20	33	12	16	36	34	40 1/2	6 1/2	6	45	6	1 1/4	24	12	23	9 1/2	12 1/2 x 26 1/2	*9 1/2 x 26 1/2	500	3400	1
2	8	30	14	20	16	44 1/2	49 1/2	7	24	62	65 1/2	24 1/2	20	11-3	20	33	12	16	36	34	40 1/2	6 1/2	6	45	6	1 1/4	28	12	23	9 1/2	12 1/2 x 26 1/2	*9 1/2 x 26 1/2	550	3500	2
3	8	36	14	20	16	47 1/2	52 1/2	8	26	68	74 1/2	25 1/2	22	11-3	24	33	12	16	36	34	43 1/2	6 1/2	6	51	6	1 1/4	28	12	25 3/4	9 1/2	12 1/2 x 26 1/2	*9 1/2 x 26 1/2	600	4000	3
3 1/2	10	36	14	20	16	47 1/2	52 1/2	8	26	68	74 1/2	25 1/2	22	13-3	28	39	12	16	42	42	43 1/2	6 1/2	6	51	6	1 1/4	28	12	25 3/4	9 1/2	12 1/2 x 26 1/2	*9 1/2 x 26 1/2	700	4100	3 1/2
3 3/4	12	36	14	20	16	47 1/2	52 1/2	8	26	68	74 1/2	25 1/2	22	15-3	28	45	12	16	48	49	43 1/2	6 1/2	6	51	6	1 1/4	28	12	25 3/4	9 1/2	12 1/2 x 26 1/2	*9 1/2 x 26 1/2	800	4700	3 3/4
4	8	42	18	20	16	49	54	8	27	74	82	26	23	11-3	24	32 1/2	12	16	36	34	40 1/4	8 1/2	6 1/4	57	6	1 1/2	32	16	29 1/4	12	14 x 32	11 x 15	700	4800	4
5	10	42	18	20	16	49	54	8	27	74	82	26	23	13-3	28	38 1/2	12	16	42	42	40 1/4	8 1/2	6 1/4	57	6	1 1/2	32	16	29 1/4	12	14 x 32	11 x 15	750	5300	5
6	10	44	18	24	16	48	53	10	27	76	83	25	23	13-7	28	38 1/2	12	16	42	42	40 3/4	8 1/2	6 1/4	57	6	1 1/2	36	16	29 3/4	12	14 x 32	11 x 15	800	6400	6
7	12	44	18	24	16	48	53	10	27	76	83	25	23	15-7	32	44 1/2	12	16	48	49	40 3/4	8 1/2	6 1/4	57	6	1 1/2	36	20	29 3/4	12	14 x 32	11 x 15	900	7900	7
7 1/2	14	44	18	24	16	48	53	10	27	76	83	25	23	17-7	36	50 1/2	12	16	54	84	40 3/4	8 1/2	6 1/4	57	6	1 1/2	36	24	29 3/4	12	14 x 32	11 x 15	950	9000	7 1/2
8	12	48	19	24	16	47	51 1/2	10	26	88	86	25	22	15-7	32	48	12	20	48	49	39 1/4	9	9 3/4	67	6	1 1/2	36	20	30	14	14 x 32	11 x 15	950	10000	8
9	14	48	19	24	16	47	51 1/2	10	26	88	86	25	22	17-7	36	54	12	20	54	84	39 1/4	9	9 3/4	67	6	1 1/2	36	24	30	14	14 x 32	11 x 15	1000	11000	9
10	12	54	19	24	20	49 1/2	54	10	28	94	95	25 1/2	24	15-11	32	48 1/2	12	20	48	49	39 1/2	9	10 1/4	73	6	2	42	20	34 7/8	13 1/2	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1100	12000	10
10 1/2	15	54	19	24	20	49 1/2	54	10	28	94	95	25 1/2	24	19-1	36	52 1/2	16	20	54	90	39 1/2	9	10 1/4	73	8	2	42	24	34 7/8	13 1/2	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1350	13000	10 1/2
10 3/4	16	54	19	24	20	49 1/2	54	10	28	94	95	25 1/2	24	20-1	36	52 1/2	16	20	54	96	39 1/2	9	10 1/4	73	8	2	42	24	34 7/8	13 1/2	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1350	13700	10 3/4
11	12	60	21	24	20	49 1/2	54	12	28	108	100 1/2	25 1/2	24	16-1	32	47	16	24	48	49	39 1/2	9 1/8	10 3/4	83	8	2	48	20	34 1/2	16	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1300	12500	11
12	14	60	21	24	20	49 1/2	54	12	28	108	100 1/2	25 1/2	24	18-1	36	53	16	24	54	84	39 1/2	9 1/8	10 3/4	83	8	2	48	24	34 1/2	16	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1400	14200	12
13	16	60	21	26	20	49 1/2	54	12	28	108	100 1/2	25 1/2	24	20-3	40	53	16	24	54	96	39 1/2	9 1/8	10 3/4	83	8	2	48	24	34 1/2	16	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1400	15500	13
14	15	66	24	28	20	49 1/2	54	12	28	114	106 1/2	25 1/2	24	19-5	36	52 1/2	16	24	54	90	39 1/2	11 1/8	10 3/4	89	8	2	54	24	50	17	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1500	16400	14
15	16	66	24	28	20	49 1/2	54	12	28	114	106 1/2	25 1/2	24	20-5	40	52 1/2	16	24	54	96	39 1/2	11 1/8	10 3/4	89	8	2	54	24	50	17	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1550	17100	15
15 1/2	18	66	24	28	20	49 1/2	54	12	28	114	106 1/2	25 1/2	24	22-5	40	58 1/2	16	24	60	108	39 1/2	11 1/8	10 3/4	89	8	2	54	24	50	17	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1650	17900	15 1/2
16	16	72	24	30	20	49 1/2	54	12	28	120	112 1/2	25 1/2	24	20-7	40	52 1/2	16	24	54	96	35	11 1/8	10 3/4	95	8	2	54	24	54	19	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1700	18500	16
17	18	72	24	30	20	49 1/2	54	12	28	120	112 1/2	25 1/2	24	22-7	40	58 1/2	16	24	60	108	35	11 1/8	10 3/4	95	8	2	54	24	54	19	14 3/4 x 38 1/2	11 3/4 x 17 1/8	1800	20300	17
18	18	78	24	30	20	49 1/2	54	12	28	126	118	25 1/2	24	22-7	40	58 1/2	16	24	60	108	54	12	10 3/4	101	8	2	54	24	60	20	16 x 28	16 x 28	1900	21400	18
19	18	84	24	30	20	49 1/2	54	12	28	132	124	25 1/2	24	22-7	40	58 1/2	16	24	60	108	54	12	10 3/4	108	8	2	54	24	68	20	16 x 28	16 x 28	2000	23400	19

*One Opening.

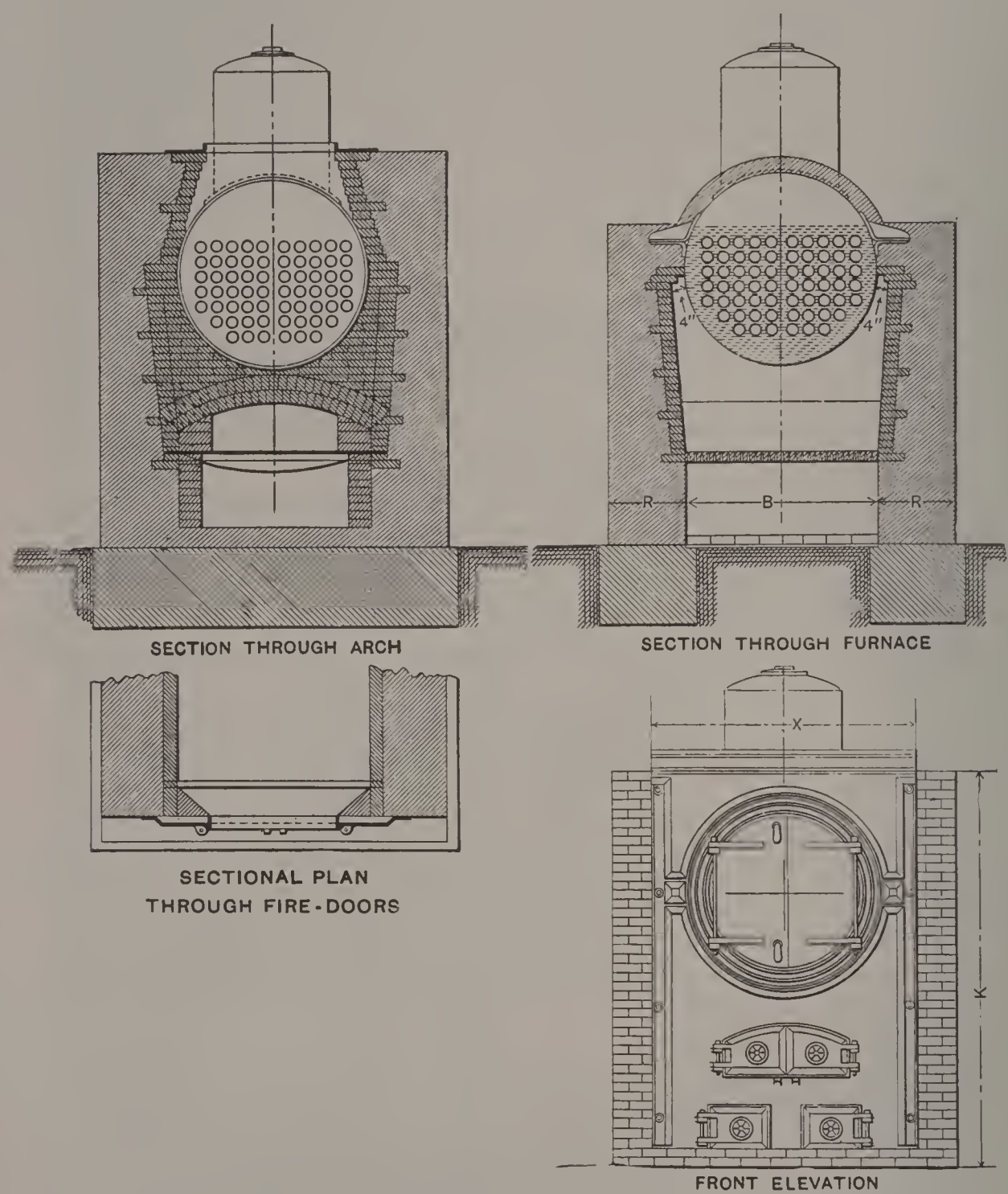


Figure 22.

Setting for Stationary Full-Arch Front Boilers.

In setting Stationary Boilers, the side walls should be so built that the longitudinal seams of the shell will be protected from the fire. Pressed steel wall brackets furnished on the larger sizes.

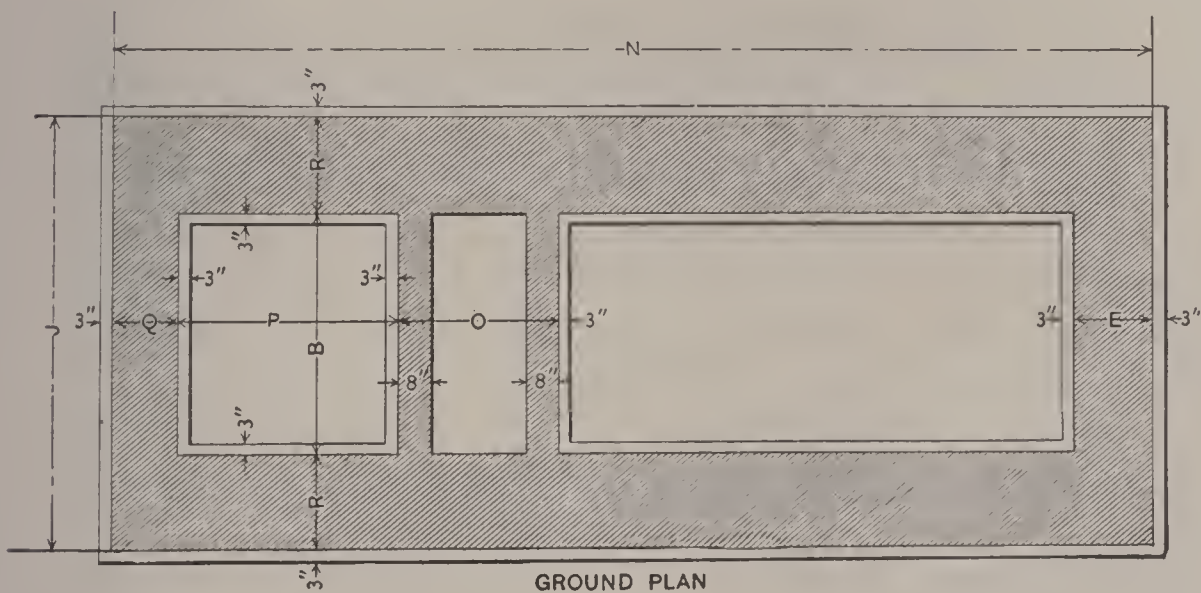
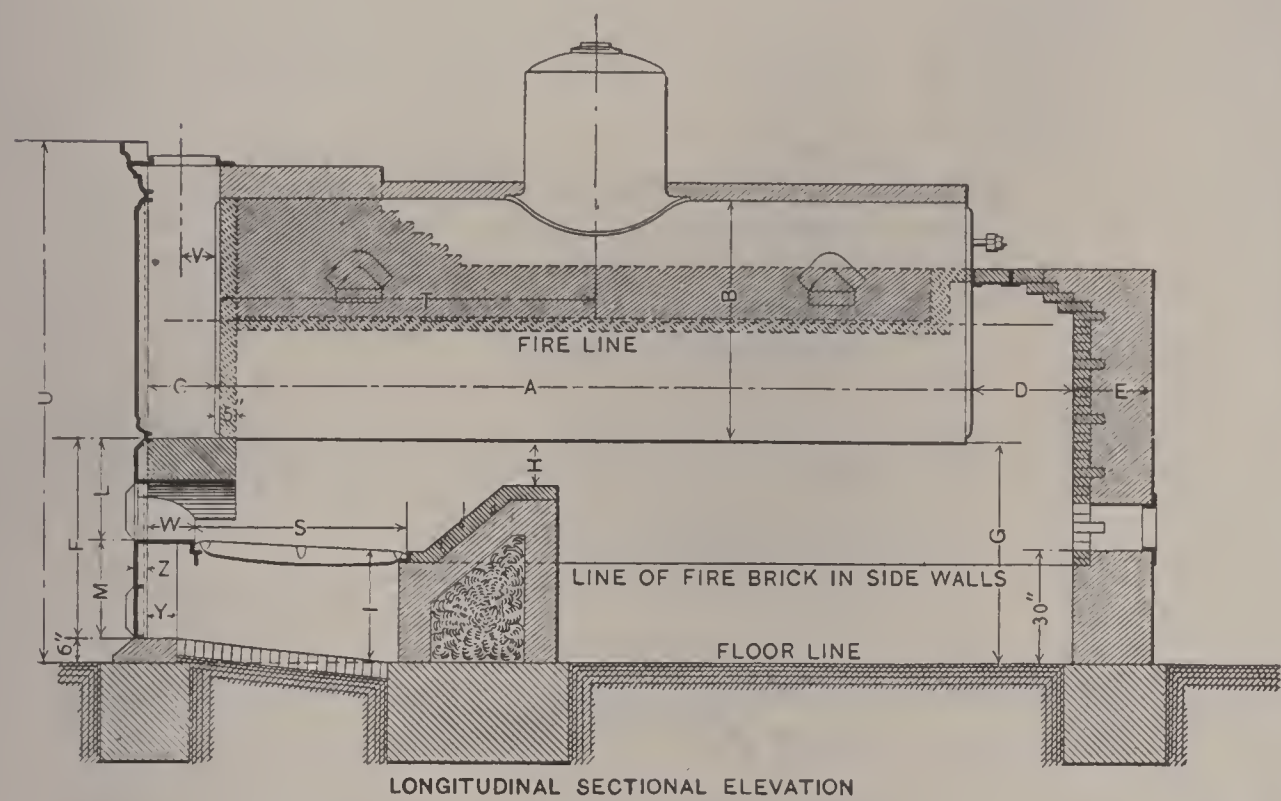


Figure 23.
Full-Arch Boiler.

Water-Bottom Portable Boiler.

Specifications.

Number of Size	1	2	3	4	5	6	7	7½	8	9	10
Horse-Power, as usually rated	8	10	12	15	20	25	30	35	40	50	60
Diameter of Boiler	28	30	32	32	34	36	40	40	40	44	48
Length of Furnace (see note below)	36	38	38	44	52	52	60	60	60	64	64
Width of Furnace	22	24	26	26	28	30	34	34	34	38	42
Height of Furnace	33	35	35	35	37	40	43	43	43	50	52
Number of Tubes (3-inch diameter)	18	20	24	24	28	32	38	40	40	46	52
Length of Tubes used	6	7	6½	7	8	8½	8	9	10½	11½	12
Mean Thicknesses { Shell and outside of Fire-Box Furnace Plate Tube Sheets	No. 4.	¼	¼	¼	¼	¼	8²	8²	8²	16	16
	8²	9²	9²	8²	9²	9²	8²	9²	8²	16	16
	3⁄8	3⁄8	3⁄8	3⁄8	3⁄8	3⁄8	3⁄8	3⁄8	3⁄8	3⁄8	3⁄8
	14	16	18	18	20	20	22	22	22	22	26
Diameter of Dome											
Height of Dome											
Diameter of Stack											
Length of Stack	20	20	20	20	24	24	30	35	40	40	50
Length of Boiler over all, in feet	11	12	11¾	13	14½	15	15	16	17½	19¼	20
Weight of Boiler on Skids	3150	3650	3900	4150	5100	5900	7000	7450	7950	9900	11300
Weight of Boiler Fixtures	500	550	600	650	950	1000	1150	1250	1350	1500	1700
Weight of Boiler and Fixtures, complete on skids	3650	4200	4500	4800	6050	6900	8150	8700	9300	11400	13000
Weight of Boiler and Fixtures, complete on wheels	4100	4700	5000	5300	6600	7500	8700	9300	9900	12000	13700

Fixtures.

With a boiler ordered "complete," the following fixtures are sent:

Grates,
Steam Gauge,
Water Gauge, fitted with Stand Pipe,
Gauge Cocks,

Safety Valve,
Blow-off Cock,
Check Valve,
Stop Valve,
Smoke Stack and Guys,

All steam openings 2½ inches and larger, are reinforced with a flange.

All smoke stacks are No. 16 gauge; if heavier is required a proportionate charge will be made.

When order calls for boiler mounted on wheels, the tongue and brake are furnished, but the neck yoke, evener whiffletrees and hand-pump are subject to order, and are charged extra.

Unless otherwise ordered, we send the regular straight stack with guys.

When hinged stack is ordered, we understand that the short stack with spark arrester is wanted; an extra charge is made for same.

Every Boiler is thoroughly tested under steam before it leaves the shop.

Open-Bottom Portable Boiler.

This boiler is made of homogeneous open-hearth steel plate, and under the same careful supervision as all boilers on our list. The mud-ring of wrought iron or steel (2"x3") forms the base of the boiler. This ring gives a three-inch water space on all sides of the fire. The furnace is adapted for burning wood or coal. The door mouth is formed by flanging the inside plate outward to meet the flange of the outside plate. The two flanges are riveted together and caulked. This construction removes the rivets and caulked edge from direct contact with the fire, and avoids the trouble experienced where the door opening is surrounded by a solid or box ring with rivet heads projecting into the furnace. The shell of the boiler is double riveted, the furnace is supplied with a fusible plug in the crown sheet, and the boiler is thoroughly well made throughout.

Specifications.

Number of Size	4	5	6	7	8	9	10	11	12	13	14	15
Horse-Power, as usually rated	25	30	35	40	50	60	70	80	90	100	110	125
Diameter of Boiler	40	42	44	44	48	54	56	58	58	62	64	66
Length of Furnace, inside	48	50	50	50	54	60	60	60	60	60	60	60
Width of Furnace, inside	34	36	38	38	42	48	50	52	52	56	58	60
Height of Furnace above Grates	33	34	36	36	40	44	44	48	48	50	52	58
Number of Tubes (3-inch diameter)	34	40	44	44	54	60	66	76	76	90	100	108
Length of Tubes used	8	8	8½	10	10½	11	12	12	14	14	14	15
Mean Thicknesses { Shell and outside of Fire-box	9	9	9	9	10	11	12	12	14	14	14	15
Furnace Plate	15	15	15	15	16	16	16	16	16	16	16	16
Tube Sheets	15	15	15	15	16	16	16	16	16	16	16	16
Diameter of Dome	22	22	26	26	26	30	30	32	32	32	36	36
Height of Dome	24	24	28	28	28	34	34	36	36	36	40	40
Diameter of Stack	18	20	20	20	22	24	26	26	26	30	30	32
Length of Stack	24	24	30	36	36	36	40	40	50	50	50	50
Weight of Boiler	6300	6900	7600	8100	9000	11000	12800	14000	15000	16400	17200	18100
Weight of Boiler Fixtures	1150	1250	1500	1500	1600	1850	2000	2150	2400	2600	2800	2900
Weight of Boiler and Fixtures, complete	7450	8150	9100	9600	10600	12850	14800	16150	17400	19000	20000	21000

Fixtures.

With a boiler ordered "complete," the following fixtures are sent:
Grates, Water Gauge fitted with Stand Pipe,
Steam Gauge, Gauge Cocks,

Check Valve,
Stop Valve,
Smoke Stack and Guys.

All steam openings 2½ inches and larger are reinforced with a flange. All smoke stacks, up to and including 28 inches diameter, are No. 16 gauge, and larger diameters of No. 14, unless otherwise ordered; if heavier gauge is required, a proportionate charge will be made.
Every boiler is tested and inspected, before shipment, by a responsible Steam Boiler Inspection and Insurance Company, at 150 pounds hydrostatic pressure per square inch, and the purchaser can have a certificate of inspection and a policy of insurance for one year issued by the Insurance Company. This policy is payable to the purchaser, and will be in force and valid wherever the boiler is located.

WATER TUBE BOILERS.

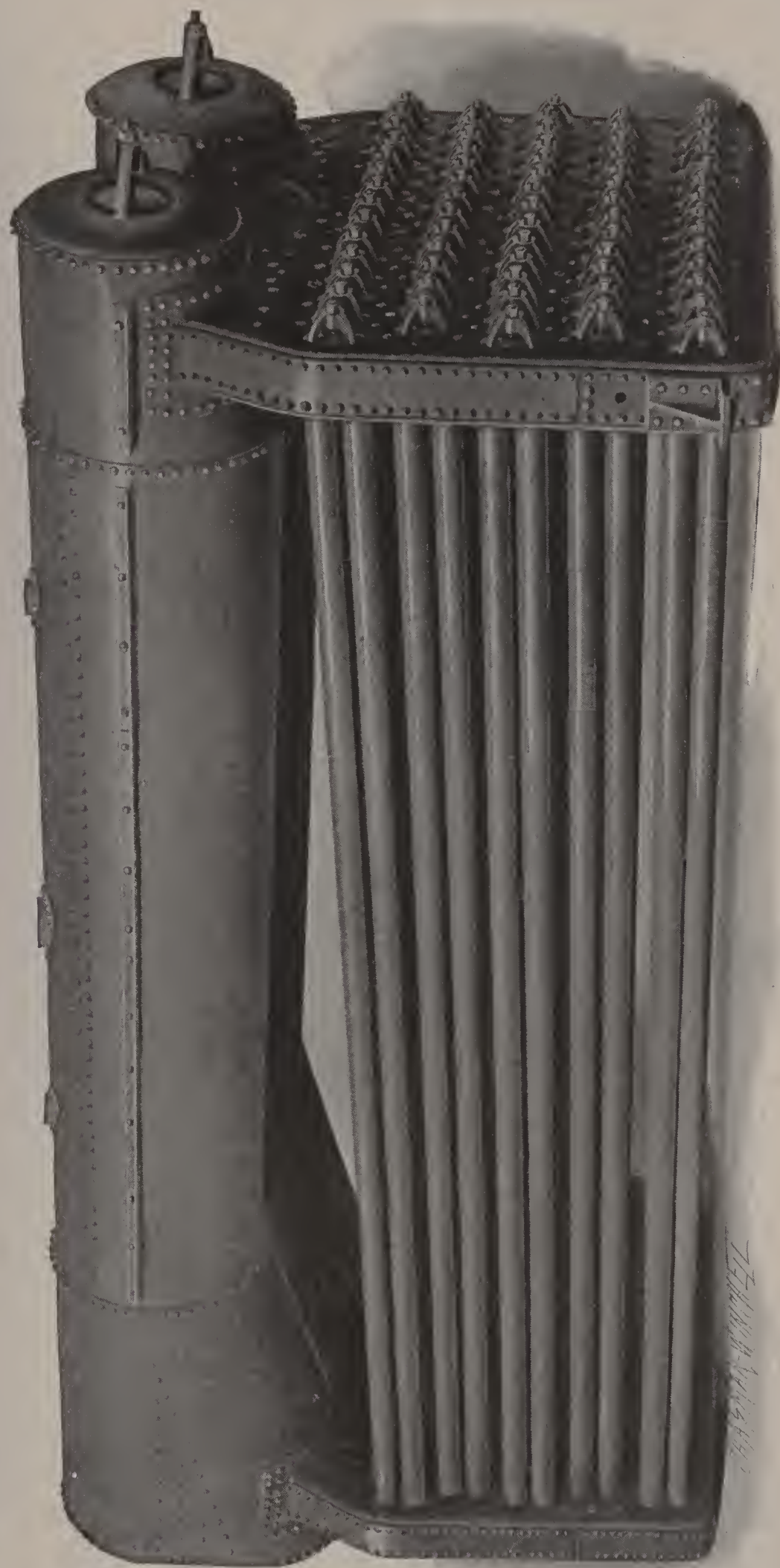


Figure 24.

Made in sizes 150 H. P. to 500 H. P. For steam pressures up to 200 pounds.

BOILER FRONTS.

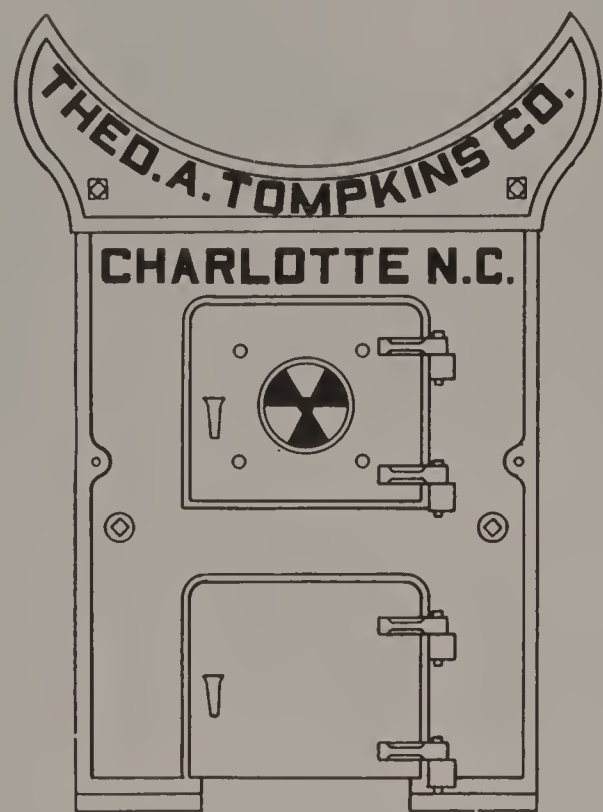


Figure 25.
Half-Arch Front "B".

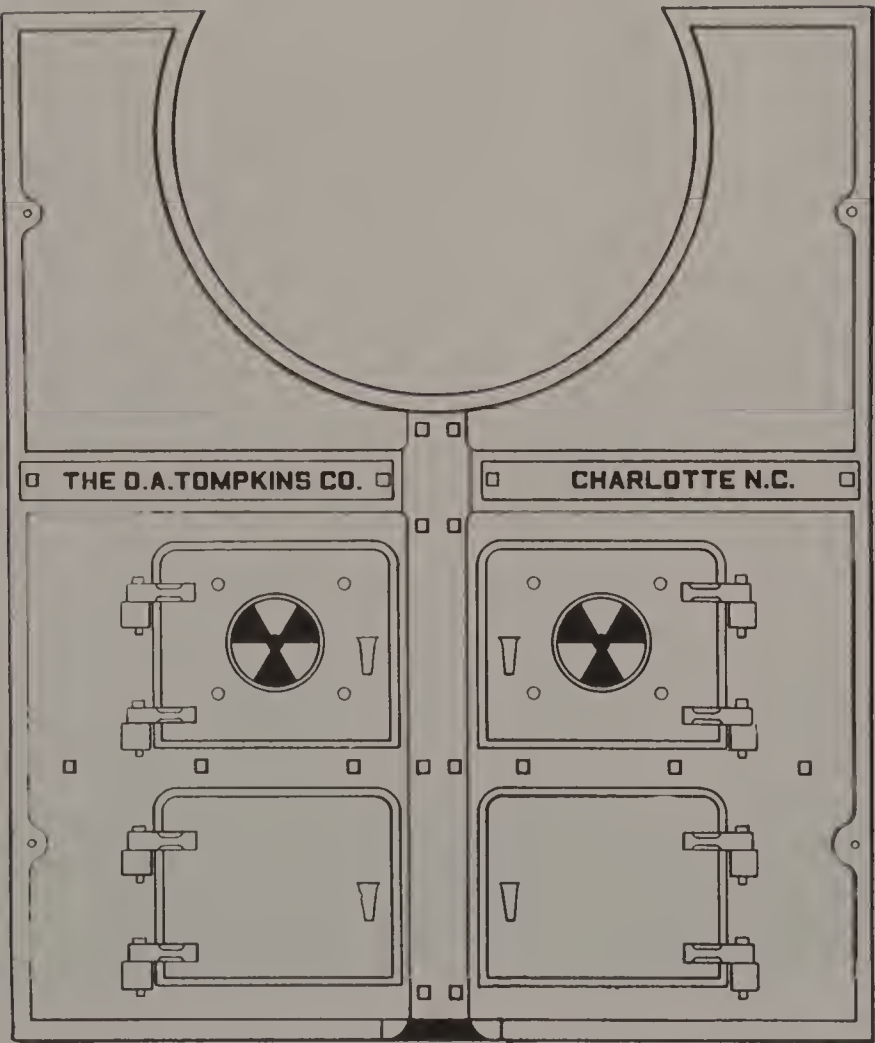


Figure 26.
Three-Quarters-Arch Front.

BOILER FRONTS.

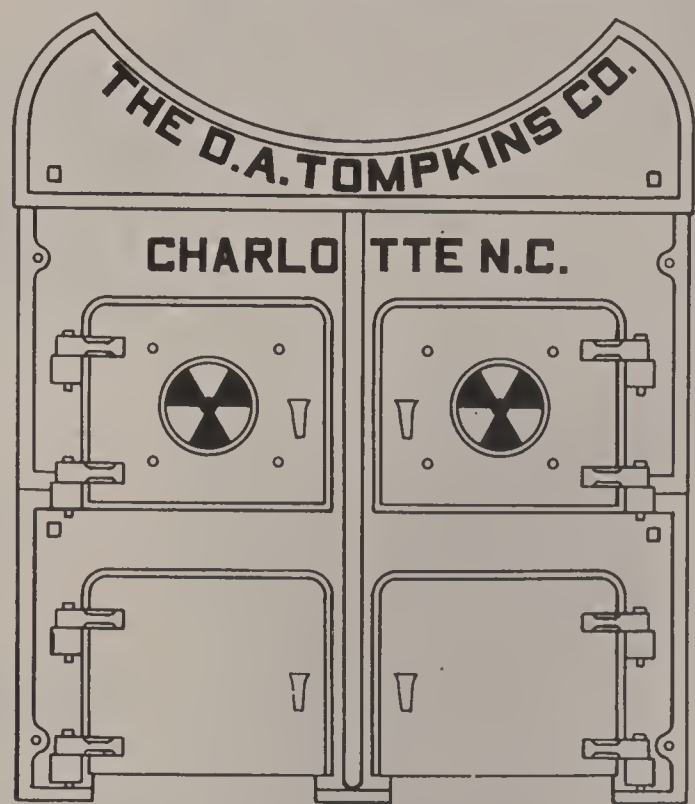


Figure 27.
Half-Arch Front "C."

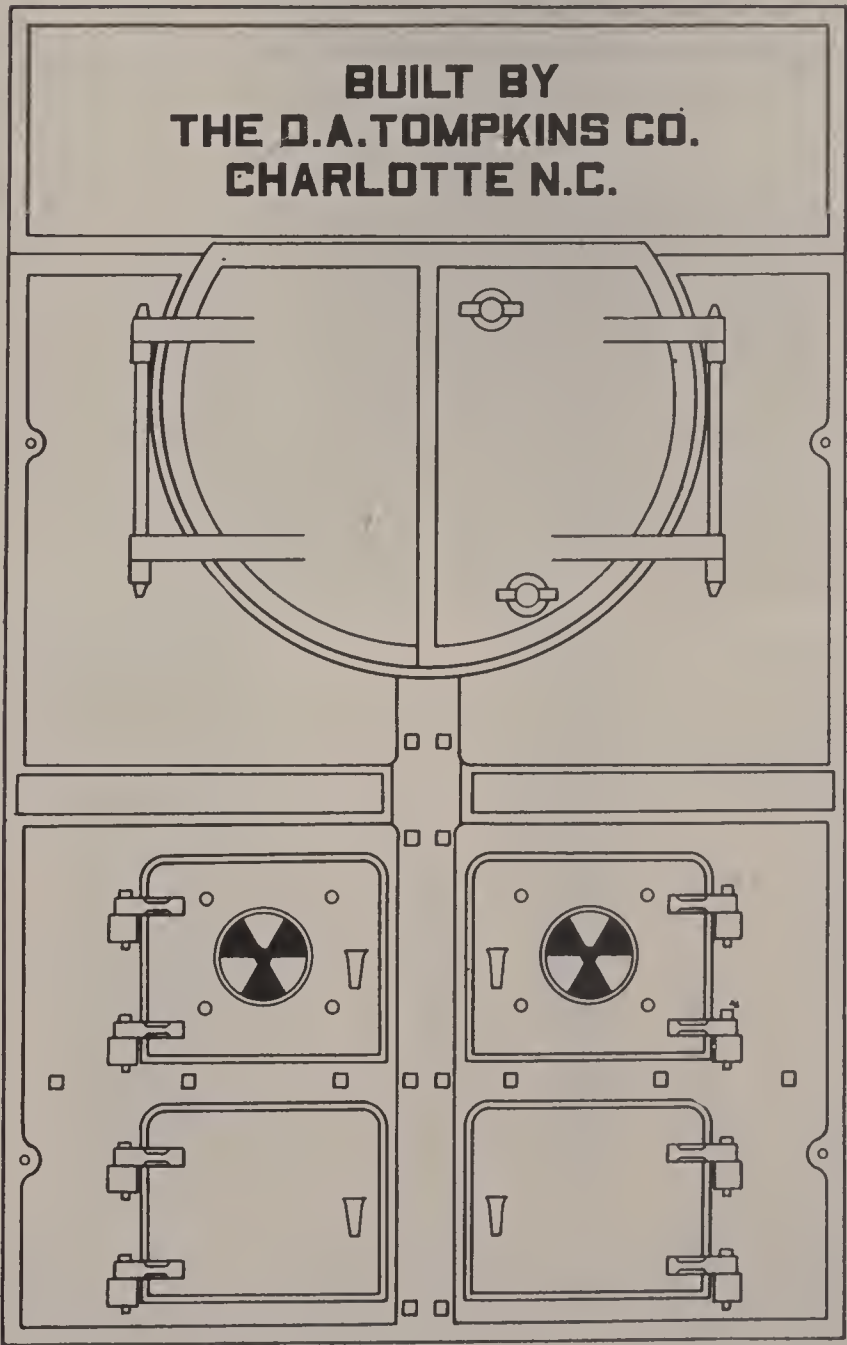
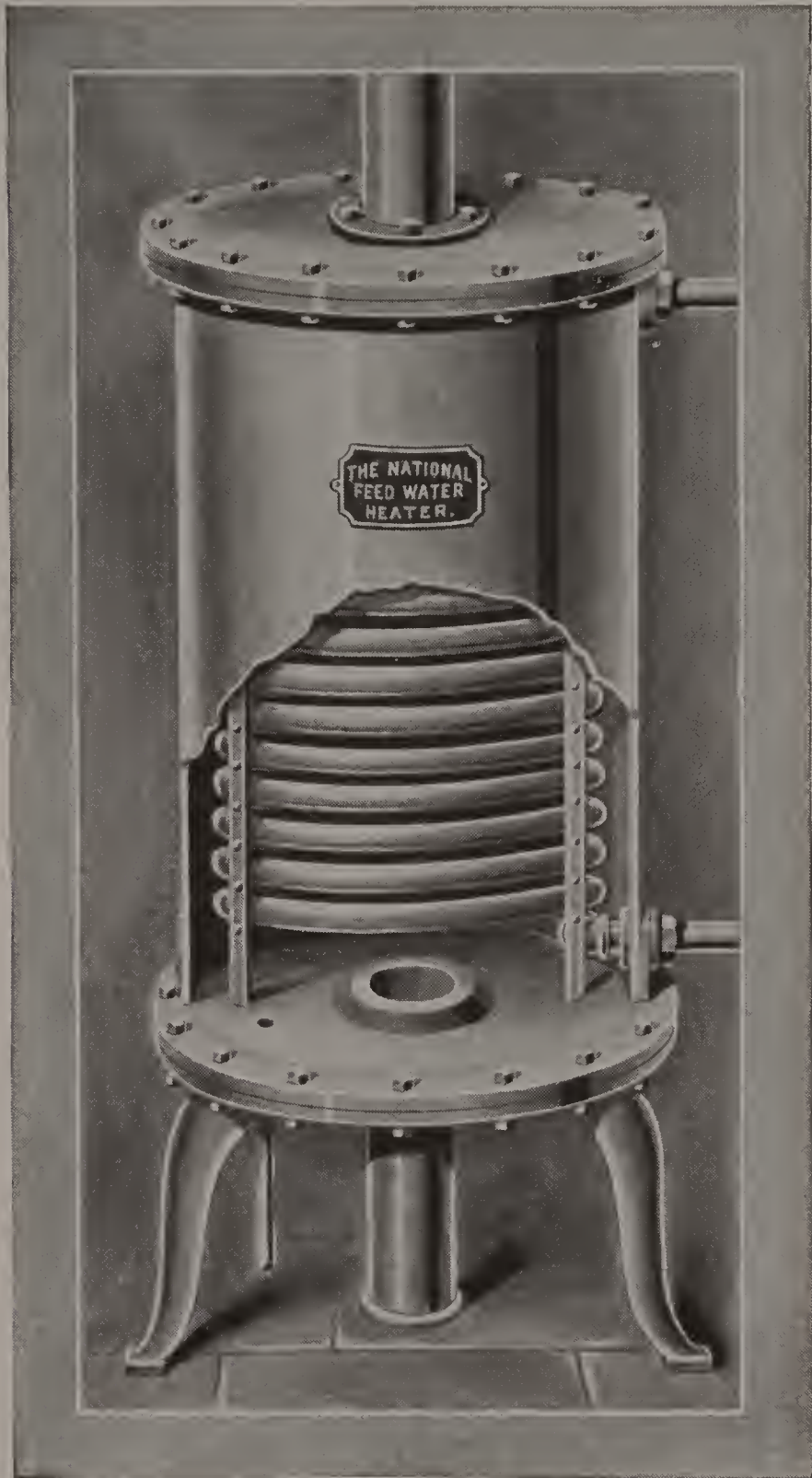


Figure 28.
Full-Arch Front.



FEED WATER
HEATERS.

60 Horse Power.

This cut represents a No. 6 (60 horse-power) HEATER, with a portion of the shell cut away, to show the coil. It also shows how easily the Heater can be put up and connected to the exhaust pipe and the feed pipes.

Figure 29.

No.	Horse-power	Diameter of Feed-pipe Inches	Diameter of Exhaust-pipe Inches	Outside Dimensions of Heater.		Weight Pounds.	No.	Horse-power	Diameter of Feed-pipe Inches	Diameter of Exhaust-pipe Inches	Outside Dimensions of Heater.		Weight, Pounds.
				Height, Inches.	Diam., Inches.						Height, Inches.	Diam., Inches.	
05	5	1½	2	*10	7	35	25	250	2	8	76	26	1,450
1	10	1½	2	12	11	65	30	300	2	8	84	26	1,650
1½	15	1½	2½	17	11	80	40	400	2½	10	88	36	1,900
2	20	¾	2½	18	16	180	50	500	2½	10	102	36	2,200
2½	25	1	3	20	19	270	60	600	3	12	101	42	2,800
3	30	1	4	34	20	350	70	700	3	12	105	42	3,000
4	40	1	4	36	20	390	80	800	3	12	111	42	3,200
5	50	1	4	41	20	420	100	1,000	4	18	117	56	5,100
6	60	1	4	46	20	475	125	1,250	4	18	133	56	5,600
8	80	1	4	51	20	515	150	1,500	4	18	143	56	5,900
10	100	1¼	5	56	22	800	200	2,000	5	18	138	66	9,400
12	125	1½	5	56	22	850	250	2,500	5	18	153	66	10,500
15	150	1½	8	60	26	1,150	300	3,000	5	24	170	66	11,500
20	200	2	8	70	26	1,800	400	4,000	6	24	198	66	13,500

*The heights from No. 3 to No. 400 include legs: no legs below No. 3.

Sizes Nos. 1 to 2½ have exhaust-inlet and outlet in top head. Sizes No. .05, No. 3, and above have exhaust-inlet in bottom and outlet in top heads, unless ordered different. Size of exhaust can be varied to suit requirements. Two or more exhausts in bottom head, if necessary. Shells No. .05 to 30 are cast iron.

GRATE BARS.

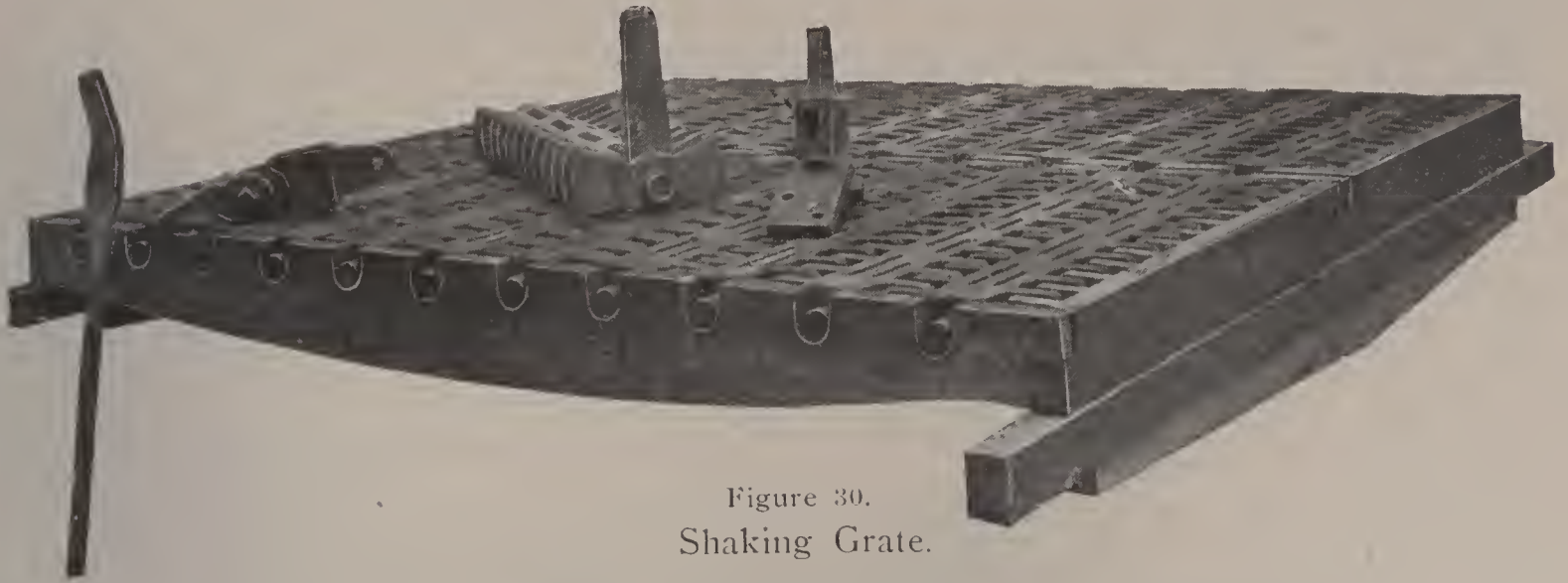


Figure 30.
Shaking Grate.



Figure 31.
Regular Plain Grate.
This Grate is sent unless otherwise specified.

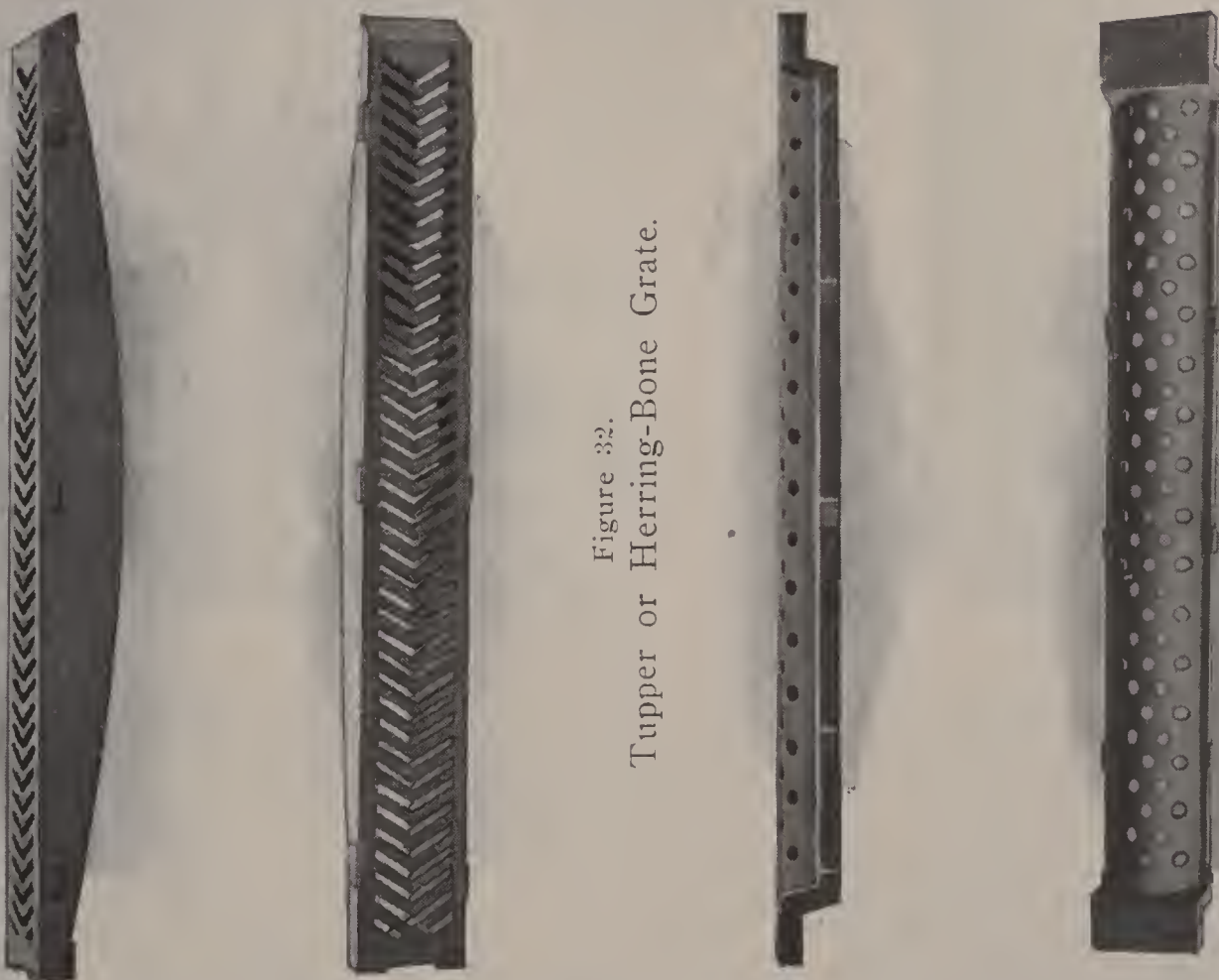


Figure 32.
Tupper or Herring-Bone Grate.

Figure 33.
Sawdust Grate.

The Regular Plain Grate is usually furnished with boilers; if, however, the Tupper or Sawdust Grate is preferred, either style may be substituted without extra charge. Sawdust Grates are six inches longer than Regular. The width of the grate surface, in all cases, equals the diameter of the boiler.

In ordering grate bars state length wanted and width of furnace.
We make patterns and cast bars of any design on order.

VERTICAL TUBULAR BOILER AND VER- TICAL ENGINE.

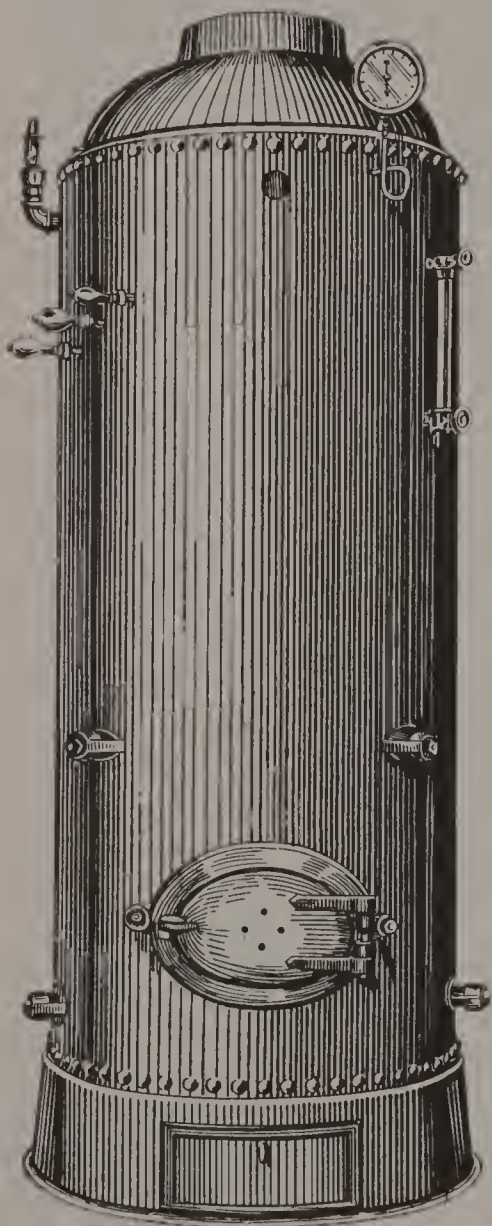


Figure 34.
Vertical Tubular Boiler.

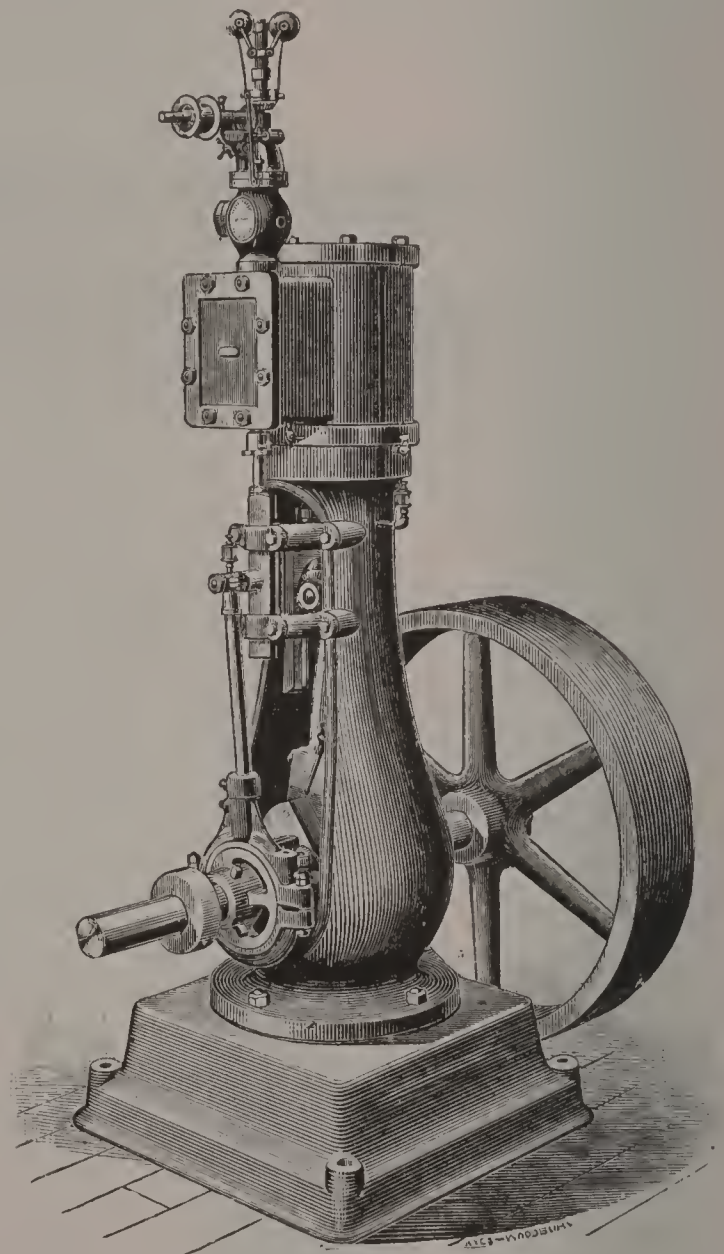


Figure 35.
Vertical Centre-Crank Engine.
2 to 50 Horse Power.

Vertical Tubular Boilers.

The fixtures comprise Base, Grates, Hood, Steam Gauge, Water Gauge, Gauge Cock, Safety Valve, Blow-off Cock, Check and Stop Valves. Specifications, Fig. 34.

Number of Size	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Horse-Power, as usually rated	4	5	6	8	10	12	15	18	20	25	30	35	40	45	50	60
Diameter of Boiler	24	24	24	30	30	30	36	36	36	42	42	42	48	48	48	54
Height of Boiler	4	5	6	5	6	7	6½	7	8	7¼	8¼	9¼	8½	9	10	9
Diameter of Furnace	20	20	20	25	25	25	31	31	31	37	37	37	43	43	43	48
Height of Furnace	24	24	24	27	27	27	27	27	27	27	27	27	30	30	30	30
Mean Thicknesses. { Shell	No. 4	No. 4	No. 4	¼	¼	¼	¼	¼	¼	⅜	⅜	⅜	⅝	⅝	⅝	⅞
Heads	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜
Furnace Plate	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
Length of Tubes used	24	36	48	33	45	57	51	57	69	60	72	84	72	78	90	78
Number of Tubes (all 2-in. diameter)	28	28	28	48	48	48	68	68	68	92	92	92	128	128	128	172
Diameter of Stack required	12	12	12	14	14	14	15	15	15	18	18	18	20	20	20	24
Weight of Boiler, without fixtures	900	1000	1150	1150	1500	1700	2100	2300	2600	3000	3400	3800	4400	4600	5000	5600
Weight of Boiler Fixtures	400	400	400	550	550	550	850	850	850	1200	1200	1200	1700	1700	1700	2300
Weight of Boiler complete	1300	1400	1550	1700	2050	2250	2950	3150	3450	4200	4600	5000	6100	6300	6700	7900

Vertical Centre-Crank Engines.

Fig. 35.

Horse Power	2	3	4	5	7	10	15	20	25	40	50
Diameter of Cylinder and Length of Stroke	3 x 4	3½ x 5	4 x 5	5 x 5	6 x 6	7 x 7	8 x 8	9 x 9	10 x 10	12 x 12	14 x 14
Ordinary Number of Revolutions	250	250	250	225	200	190	180	160	160	160	150
Diameter of Pulley	16	20	20	24	24	30	36	40	48	54	60
Face of Pulley	4	4	5	5	5	6	8	8½	10½	12½	14½
Size of Base	16 x 16	18 x 18	20 x 20	21 x 21	24 x 24	29 x 29	31 x 31	32 x 32	35 x 35	40 x 40	51 x 51
Size of Steam Pipe	¾	¾	1	1¼	1¼	1½	1½	2	2½	2½	3½
Size of Exhaust Pipe	1	1	1¼	1½	1½	2	2½	3	3	3½	4
Weight of Engine complete	275	350	530	750	870	1400	1800	2300	2950	4300	5800

Base, Governor, Pulley, and all necessary Oil Cups and Cylinder Cocks are considered parts of the engine and are included at regular prices, but Throttle Valve, Lubricator, Governor Belt, Foundation Bolts and Wrenches are not included and will not be furnished unless specially ordered. The size of pulley will be changed when necessary without extra charge except for extra weight of metal.

SLIDE VALVE ENGINE.

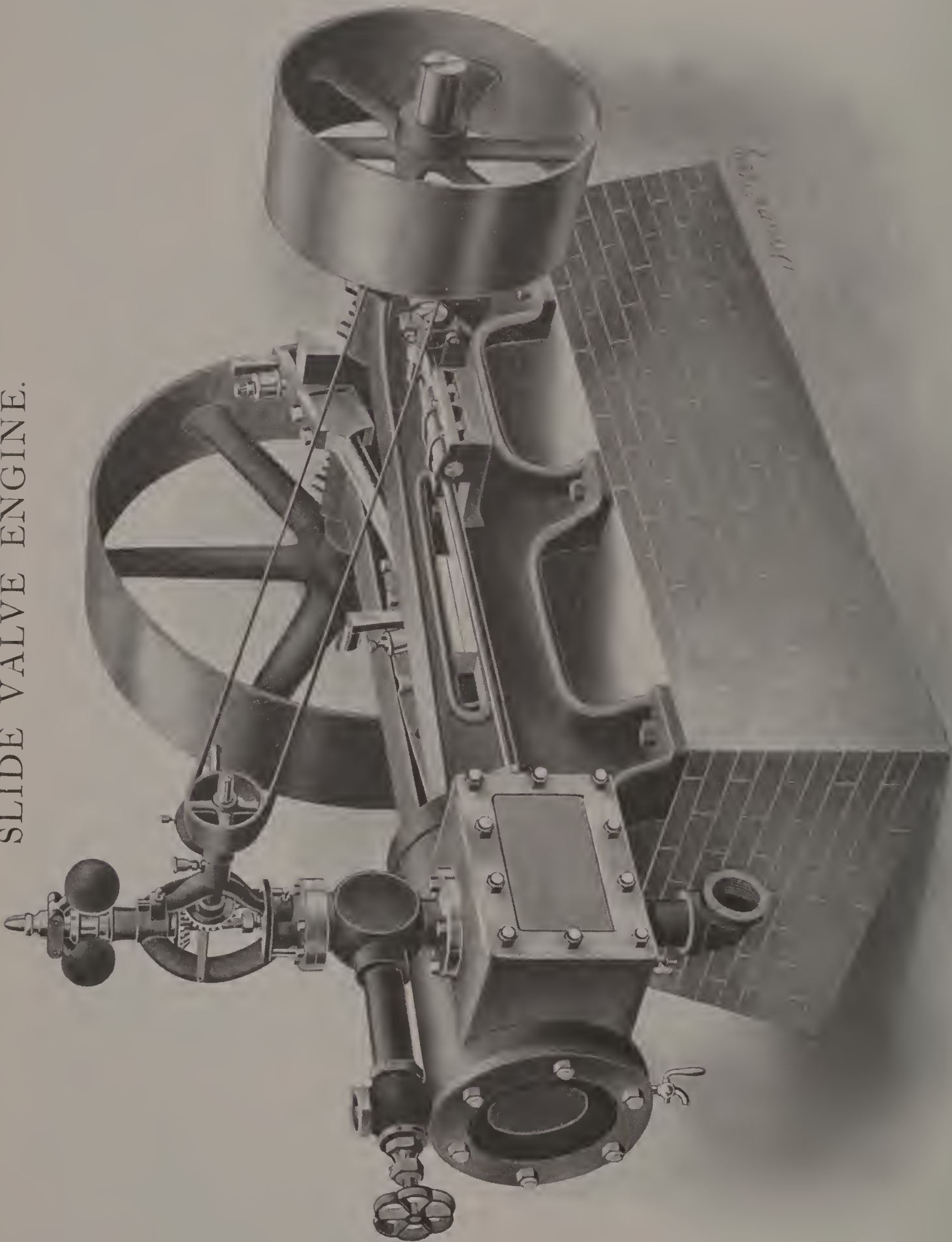


Figure 36.

SLIDE VALVE ENGINES.

Figure 36

Number of Size.	0	1	2	3	4	5	6
Number of revolutions.....	200-250	200-250	175-225	175-225	175 225	175-225	150-180
Horse power as usually rated.....	12-15	15-20	20-25	25-30	30-35	35-40	50-60
Diameter of cylinder and length of stroke.....	7x10	8½x10	9-12	10x12	11x12	12x12	13x15
Diameter of Steam pipe.....	1½ in.	2 in.	2 in.	2½ in.	2½ in.	3 in.	3 in.
Diameter of Exhaust pipe.....	2 in.	2½ in.	2½ in.	3 in.	3 in.	4 in.	4 in.
Diameter of Pulleys.....	40-20	44-24	48-26	48-30	52-30	54-30	66 36
Face of Pulleys.....	8-8	12-10	12-10	12-12	14-12	14-12	16-12
Diameter of Crank Shaft.....	2¾ in.	3 in.	3¼ in.	3¼ in.	3½ in.	3¾ in.	4½ in.
Diameter of Wrist.....	2¾ in.	3 in.	3¼ in.	3¼ in.	3½ in.	3¾ in.	4½ in.
Length of Journals.....	5 6	7-6	8½-6½	8½-6½	9¼-7¼	10-8	9½-11¼

Fixtures comprise Governor, Governor Belt, Throttle Valve, Valve Lubricator, 2 Cylinder Cocks, 2 Oil Cups, Elbow and Nipple for exhaust, and nipple drilled for Valve Lubricator.

Foundation bolts, steam and exhaust pipes, and fittings are furnished when desired at the ruling market prices.

AUTOMATIC ENGINES.

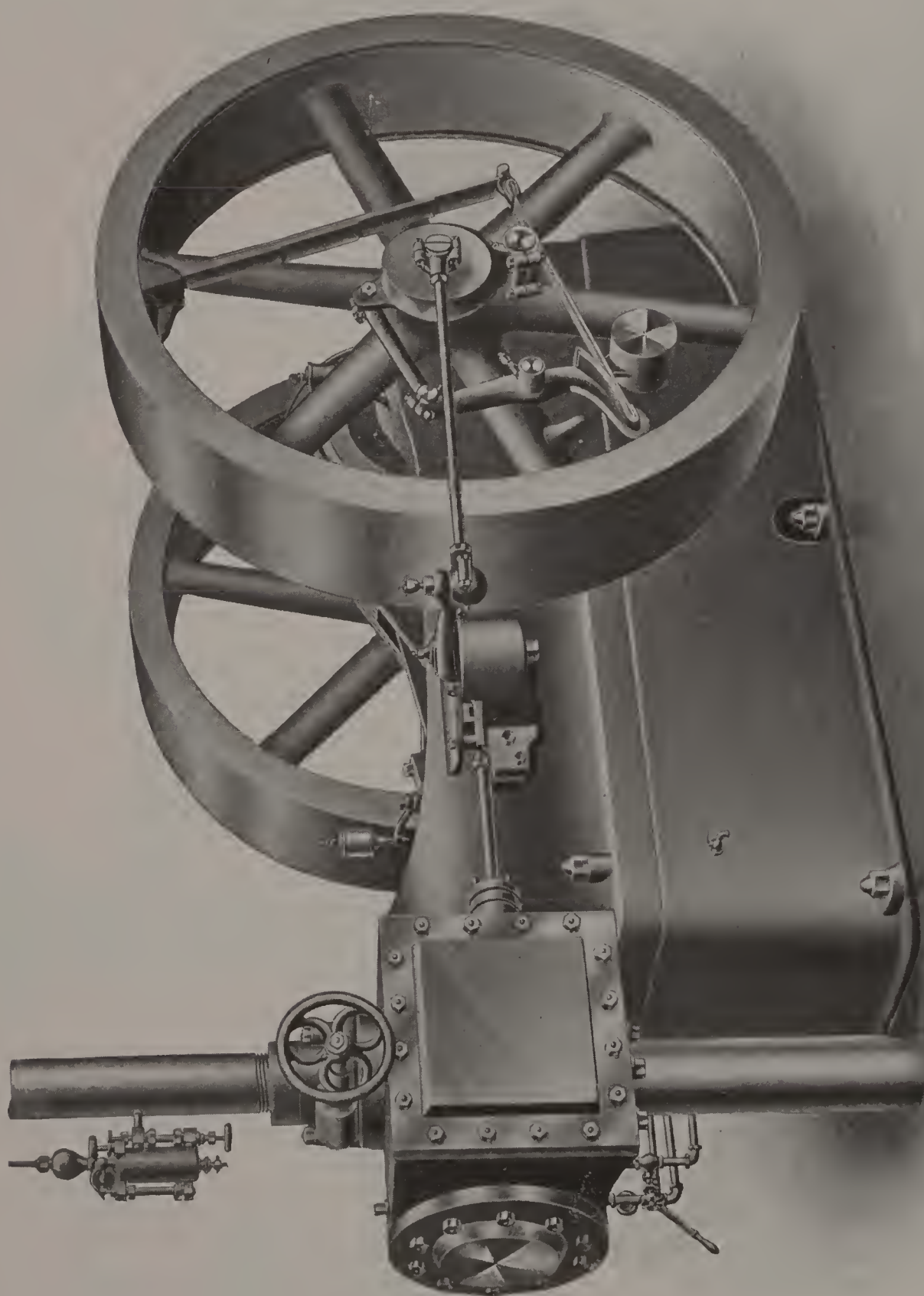


Figure 37.
High-Speed Engine—High-Grade Automatic Type.

Table of Sizes and Dimensions.

CYLINDER		Revs. per minute unless otherwise ordered.	HORSE-POWERS AT ¼ CUT-OFF.		FLY-WHEELS.		Diam. Steam Pipe.	Diam. Exhaust Pipe.	LENGTH OVER ALL, INCLUDING FLY-WHEELS.		WIDTH OVER ALL.		WEIGHT WITH SUB-BASE.	WEIGHT WITH-OUT SUB-BASE.
Diam. Inches.	Stroke. Inches.		80 lbs. initial pressure.	90 lbs. initial pressure.	Diam. Inches.	Face Inches.			Feet.	Inches.	Feet.	Inches.		
8	10	320	32	36	50	9	3½	4½	7	8	4	4	6,350	5,850
9	10	320	42	47	50	9	3½	4½	7	8	4	4	6,400	5,900
10	10	320	52	57	50	9	3½	5	7	8	4	4	6,450	5,950
11	10	320	63	69	50	10	3½	5	7	8	4	4	6,550	6,050
11½	10	320	68	75	50	10	3½	5	7	8	4	4	6,600	6,100
11	12	300	71	77	60	12	4	5	9	3	5	2	10,000	9,200
12	12	300	85	91	60	12	4	6	9	3	5	2	10,100	9,300
13	12	300	99	108	60	13	4½	6	9	3	5	2½	10,350	9,550
14	12	300	114	125	60	13	4½	6	9	3	5	2½	10,450	9,650
14	14	270	121	131	70	14	5	7	10	7	5	10	15,350	14,150
15	14	270	139	150	70	15	5	7	10	7	5	11	15,500	14,300
16	14	270	158	171	70	16	6	8	10	7	5	11½	15,700	14,500
16	16	240	160	173	78	16	6	8	12	3	6	6	22,000	19,600
17	16	240	181	196	78	17	6	9	12	3	6	6½	22,400	20,000
18	16	240	203	220	78	18	6	9	12	3	6	7	23,000	20,600
18	18	215	204	221	84	18	6	9	13	10	7	7	35,000	32,600
19½	18	215	240	260	84	20	7	9	13	10	7	9	35,900	33,500
21	18	215	279	302	84	22	7	10	13	10	7	10	36,800	34,400
22	18	215	302	332	84	22	7	10	13	10	7	10	36,950	34,550

Blue print of foundation furnished with engines on application.

Table of Horse Power of Automatics Engines.

At Various Initial Pressures and Speeds—Cutting off at One-Quarter Stroke.

Revs per minute.	225 REVS.				250 REVS.				275 REVS.				300 REVS.				325 REVS.			
	60	80	100	120	60	80	100	120	60	80	100	120	60	80	100	120	60	80	100	120
8x10	....	....	....	35.0	18.5	25.5	32.2	38.5	20.4	28.0	35.4	42.5	22.3	31.5	38.6	46.0	24.0	33.0	41.8	50.0
9x10	....	....	....	45.6	23.3	32.9	42.4	50.7	25.6	36.1	46.6	55.8	27.9	39.4	50.9	60.9	30.2	42.7	55.1	65.9
10x10	....	....	....	56.6	28.8	40.7	52.6	62.9	31.7	44.8	57.8	69.2	34.6	48.9	63.1	75.5	37.5	53.0	68.3	....
11x10	...	....	....	68.6	35.0	49.4	63.7	76.2	38.5	54.3	70.0	....	42.0	59.3	76.4	....	45.5	64.2	....	....
11½x10	....	....	....	73.0	39.0	53.0	67.5	....	42.8	58.5	74.0	....	46.5	64.0	....	....	50.5	69.0	....	....
11x12	....	....	68.5	81.9	41.8	59.0	76.1	91.1	45.9	64.9	83.7	100.2	50.1	70.8	91.3	109.3	200 REVS.			
12x12	....	63.3	81.7	97.8	49.8	70.4	90.8	108.6	54.8	77.4	99.8	119.5	59.8	84.5	108.9	....				
13x12	....	74.5	96.1	115.0	58.6	82.8	106.8	....	64.5	91.1	117.5	....	70.4	99.4	....	....				
14x12	62.0	85.0	108.0	....	69.0	94.5	120.0	....	76.0	104.0	....	....	83.0	113.6	....	....				
14x14	71.3	100.8	130.0	155.5	79.3	112.0	144.4	172.8	87.2	123.2	158.8	190.1	175 REVS.				....	89.6	115.5	138.2
15x14	82.1	115.9	149.5	178.9	91.2	128.8	166.1	198.8	100.3	141.7	182.7	....					72.9	103.0	132.9	159.0
16x14	93.5	132.1	170.3	....	103.9	146.8	189.3	....	114.3	161.4	....	....	150 REVS.				83.1	117.4	151.4	181.2
16x16	105.9	149.6	192.9	230.8	117.7	166.2	214.3	256.5	150 REVS.				....	116.3	150.0	179.5	94.1	133.0	171.5	205.2
17x16	119.8	169.2	218.2	261.2	133.2	188.1	242.5	....					93.2	131.6	169.7	203.1	106.5	150.4	194.0	232.2
18x16	134.6	190.1	245.2	....	149.6	211.2	....	....	150 REVS.				104.7	147.8	190.7	228.2	119.7	169.0	217.9	260.8
18x18	151.1	213.3	275.1	329.2	....	....	....	....					117.5	165.9	214.0	256.1	134.3	189.6	244.5	292.7
19½x18	177.8	251.1	323.9	....	....	....	....	....	118.5	167.4	215.9	258.4	138.3	195.3	251.9	301.4	158.1	223.2	287.9	344.5
21x18	206.7	292.0	376.5	....	....	....	....	....	137.8	194.6	251.0	300.4	160.8	227.1	292.8	350.4	183.8	259.5	334.7	....
22x18	231.0	316.0	....	....	....	....	....	....	154.0	210.5	267.0	318.0	180.0	245.0	311.0	371.0	205.0	281.0	356.0	....

Powers for speeds or pressures intermediate to those given may be obtained by proportion.

Compound Automatic Engines.
Ratings of Tandem Compound Engines.
Non-Condensing.

SIZE OF ENGINE	Rev's per Min.	INITIAL PRESSURES					SIZE OF ENGINE	Rev's per Min.	INITIAL PRESSURES					
		90	100	110	120	130			140	90	100	110	120	130	140
7 or 8 and 13x12 7½	250	51	56	59	63	68	70	210	142	157	170	181	191	195
	275	56	62	65	69	74	77	230	156	172	186	199	209	...
	300	61	68	71	76	81	84	250	169	187	203	216	...	...
9 9½ or 10½ and 16x12 10	250	77	86	91	99	102	106	175	133	148	160	170	179	186
	275	85	94	100	109	113	117	200	152	168	182	194	204	...
	300	93	103	109	118	123	128	225	171	190	205	219	...	...
9 9½ or 10½ and 16x15 10	225	87	96	102	111	115	120	210	164	181	196	209	220	232
	250	97	107	113	123	128	133	230	179	198	215	229	241	254
	275	106	118	125	136	141	...	250	195	216	233	249	262	...
10½ or 12 and 18x12 11 11½	250	94	105	113	121	126	135	175	154	170	184	196	206	218
	275	103	115	125	133	139	...	200	176	194	210	224	236	249
	300	113	126	136	145	...	...	225	197	218	236	252	265	280
10½ or 12 and 18x15 11 11½	225	106	118	128	...	...	...	175	168	186	201	214	225	235
	250	118	131	...	...	...	...	200	192	212	230	245	258	268
	275	129	...	...	...	...	...	225	216	239	258	275	290	...
10½ or 12 and 18x16 11 11½	210	105	117	127	136	142	151	175	176	196	214	226	242	255
	230	115	129	139	148	155	165	200	201	224	245	258	276	292
	250	125	140	151	161	169	179	225	226	252	276	291	310	328
10½ or 12 and 18x18 11 11½	175	99	110	119	127	133	141	160	178	199	218	230	246	260
	200	113	126	136	145	152	161	180	201	224	245	258	276	292
	225	127	142	153	163	171	182	200	223	249	272	287	307	324
11 11½ or 12½ and 19x16 12	210	122	135	146	156	164	168	175	198	219	237	253	262	281
	230	134	148	160	171	180	184	200	227	251	271	289	300	321
	250	145	161	174	186	...	...	225	255	282	305	325	337	361
11 11½ or 12½ and 19x18 12	175	115	127	137	146	154	157	160	201	223	241	257	266	286
	200	131	145	157	167	176	180	180	227	251	271	289	300	321
	225	147	163	176	188	...	...	200	252	279	301	321	333	357

We will determine the size of the high pressure cylinder when all the conditions are made known to us.



CORLISS ENGINE REPAIRS

AND OTHER HEAVY REPAIRS.

We send out men to indicate Corliss Engines (or any other engines for that matter), and determine to what extent they are in order or out of order. With the data obtainable on the ground, we can figure what an engine ought to do in the way of developing power and consuming steam which it takes fuel to make. We can tell how far it is failing to do what it ought to do and we can make an estimate of cost necessary to make the engine do what it ought to do.

We have made in our machine shop a full set of boring bars to bore any Corliss cylinder. We have overhauled several engines of one thousand horse power and over, and many smaller ones. In every case our work has given the very best satisfaction.

We are in position to do any repairs on a Corliss or any other engine. When necessary, we make new valves from patterns made in our own pattern shop and from castings made in our own foundry.

Our facilities have been very materially enlarged, our organization very materially enlarged and the field of work we cover very materially extended. We seek heavy repair jobs. We are fixed with men and tools to take good care of work entrusted to us.

If you do not know whether your engine is giving you satisfactory results, let us send a man to "indicate" it and report on it. After that we can tell you how it is doing and if not doing right, we can tell you what to do about it and how much it will cost to fix it right.

STANDARD CORLISS ENGINE.
GIRDER FRAME TYPE.

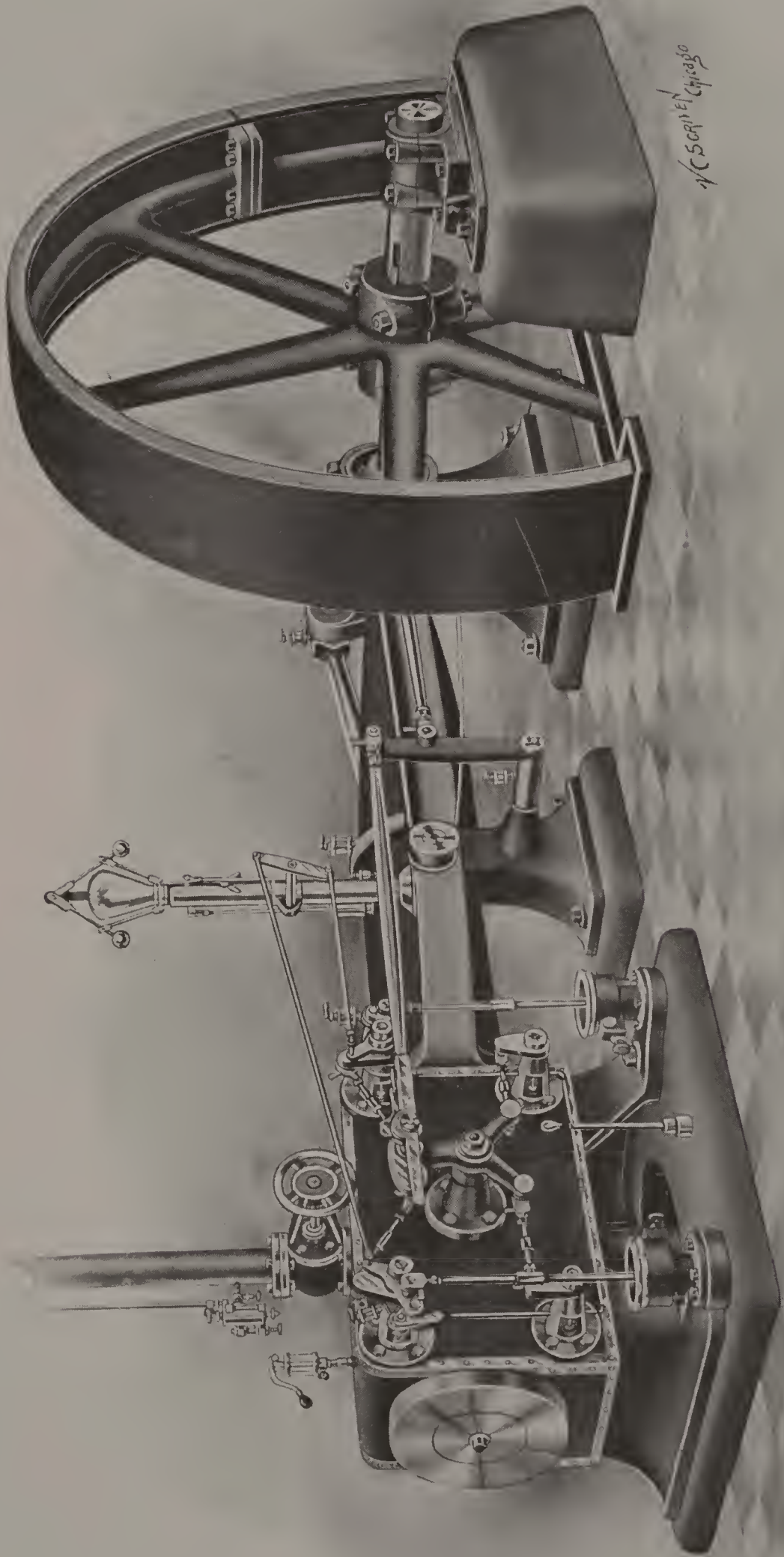


Figure 38.

Table of Standard Sizes of Simple Corliss Engines.

SIZE.		Revolutions.	INDICATED HORSE POWER—NON-CONDENSING.						BAND FLY WHEEL.			Approximate Weight in Pounds of Engines Complete.
Diameter of Cylinder.	Stroke.		80 Pounds Pressure.		90 Pounds Pressure.		100 Pounds Pressure.		Diameter.	Face	Approximate Weight in Pounds.	
			1-5 Cut Off.	1-4 Cut Off.	1-5 Cut Off.	1-4 Cut Off.	1-5 Cut Off.	1-4 Cut Off.				
11 in.	24 in.	110	40	49	50	59	55	65	8 ft.	14 in.	4,800	12,000
12 in.	30 in.	90	54	65	62	74	69	83	8 ft.	15 in.	5,200	15,000
12 in.	36 in.	85	61	73	70	84	78	94	9 ft.	17 in.	6,000	18,000
14 in.	36 in.	85	83	100	95	114	107	128	10 ft.	19 in.	8,500	22,000
16 in.	36 in.	82	105	126	120	144	135	162	12 ft.	22 in.	9,500	26,000
16 in.	42 in.	78	116	139	133	159	150	179	12 ft.	24 in.	11,000	29,000
18 in.	36 in.	80	129	155	148	177	166	199	14 ft.	24 in.	12,000	29,000
18 in.	42 in.	78	147	176	168	202	189	227	14 ft.	26 in.	13,000	32,000
20 in.	42 in.	75	175	210	200	240	225	270	15 ft.	29 in.	15,000	42,000
20 in.	48 in.	72	192	230	219	263	246	296	15 ft.	29 in.	17,000	45,000
22 in.	42 in.	75	211	254	242	290	271	326	16 ft.	31 in.	19,000	48,000
22 in.	48 in.	72	232	278	265	318	298	358	16 ft.	36 in.	21,000	52,000
24 in.	48 in.	70	268	322	307	368	345	414	16 ft.	38 in.	24,000	64,000
26 in.	48 in.	70	315	378	360	432	405	486	18 ft.	42 in.	28,000	70,000
28 in.	48 in.	68	355	426	406	487	457	548	20 ft.	44 in.	30,000	75,000
30 in.	48 in.	68	385	453	444	526	507	594	20 ft.	44 in.	33,000	80,000

NOTE 1—The speeds can be varied to suit particular requirements with corresponding changes in power.

NOTE 2—Sizes and weights of wheels can be changed if desired.

STANDARD CORLISS ENGINE.

HEAVY DUTY TYPE.

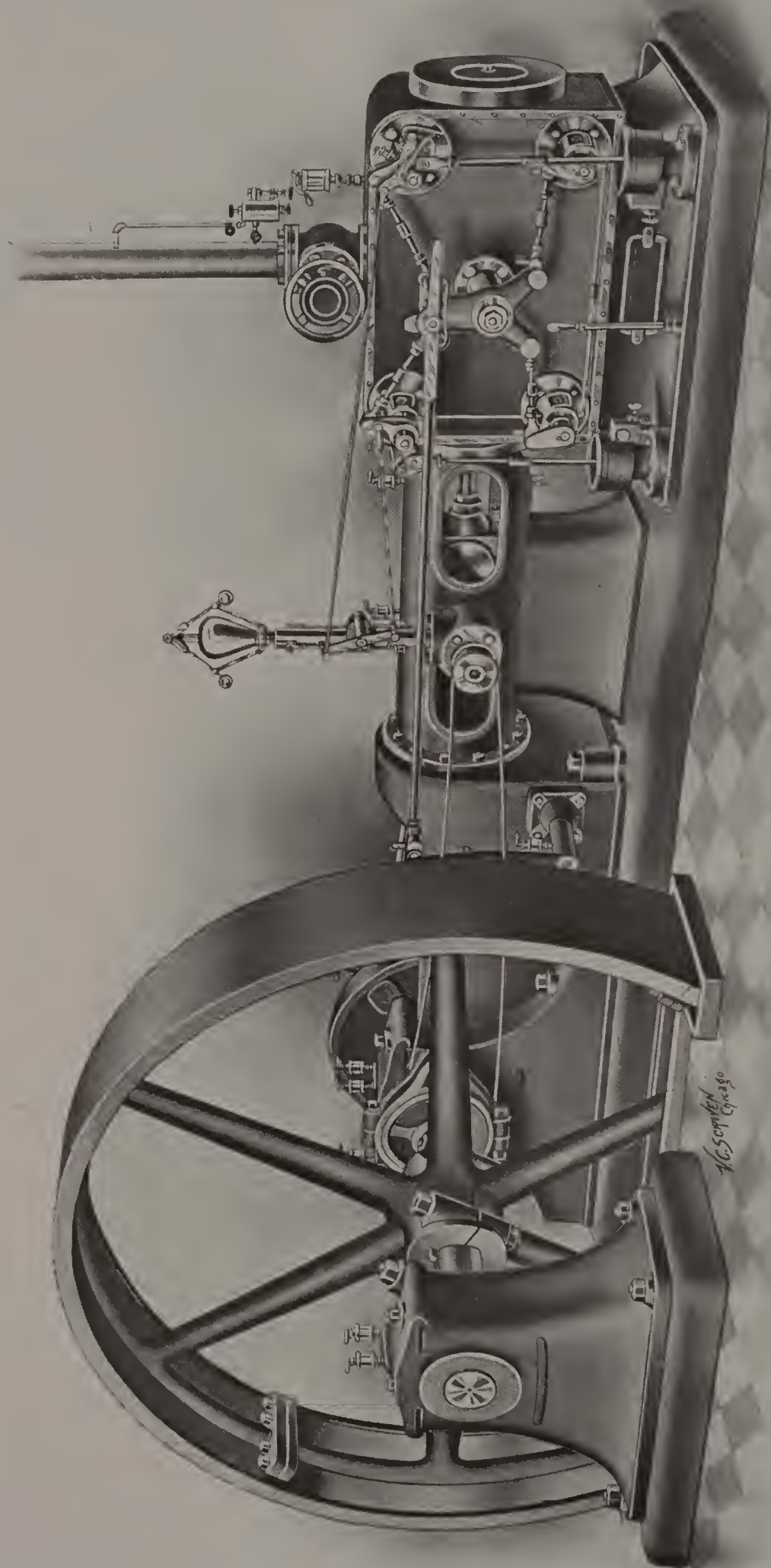


Figure 39.

STANDARD CORLISS ENGINE.
HEAVY DUTY TYPE.



Figure 39.

Indicated Horse Power of Standard Compound Corliss Engines.

Condensing.

CYLINDERS.			100-LB. GAUGE PRESSURE.					CYLINDERS.			125-LB. GAUGE PRESSURE.					CYLINDERS.			150-LB. GAUGE PRESSURE.												
Diameters			Cut-off in h. p. cyl. I. H. P. per 1 r. p. m.					R. P. M.			Diameters			Cut-off in h. p. cyl. I. H. P. per 1 r. p. m.					R. P. M.			Diameters					Cut-off in h. p. cyl. I. H. P. per 1 r. p. m.				
H.P.	L.P.	Stroke	1-5	1-4	1-3	1-5	1-4	1-3	1-5	1-4	1-3	1-5	1-4	1-3	1-5	H.P.	L.P.	Stroke	1-5	1-4	1-3	1-5	1-4	1-3							
10	16	24	120	79	92	113	.658	.766	.941	10	18	24	120	103	121	147	.857	1.009	1.225	10	20	30	100	136	157	194	1.36	1.57	1.94		
10	16	30	100	82	96	117	.820	.960	1.170	10	18	30	100	107	125	153	1.07	1.25	1.53	10	20	36	90	145	170	210	1.611	1.89	2.33		
10	16	36	90	89	104	127	.989	1.155	1.410	10	18	36	90	115	135	165	1.28	1.50	1.83	10	20	30	100	162	190	234	1.620	1.90	2.34		
12	20	30	100	124	142	174	1.240	1.420	1.740	11	20	30	100	131.	153	187	1.31	1.53	1.87	11	22	36	90	175	205	253	1.945	2.28	2.81		
12	20	36	90	131	154	188	1.454	1.710	2.090	11	20	36	90	141	165	202	1.565	1.835	2.245	11	22	42	80	181	213	263	2.26	2.66	3.29		
13	22	30	100	143	168	204	1.430	1.680	2.040	12	22	30	100	157	185	227	1.57	1.85	2.27	12	24	36	90	208	244	301	2.81	2.71	3.35		
13	22	36	90	154	183	221	1.710	2.033	2.460	12	22	36	90	168	196	242	1.867	2.18	2.69	12	24	42	80	215	253	312	2.69	3.165	3.90		
15	24	36	90	199	233	285	2.220	2.591	3.170	12	22	42	80	174	203	252	2.17	2.54	3.15	13	26	36	90	244	286	353	2.71	3.18	3.92		
15	24	42	80	207	242	295	2.590	3.025	3.685	13	24	36	90	198	231	284	2.20	2.56	3.16	13	26	42	80	252	297	366	3.15	2.71	4.575		
16	26	36	90	229	268	329	2.540	2.980	3.650	13	24	42	80	204	239	294	2.55	2.99	3.67	14	28	36	90	282	332	410	3.13	3.69	4.56		
16	26	42	80	238	278	341	2.975	3.470	4.270	14	26	36	90	228	270	332	2.53	3.00	3.69	14	28	42	80	292	344	425	3.65	4.30	5.31		
18	30	36	90	295	346	421	3.28	3.83	4.68	14	26	42	80	237	280	344	2.96	3.50	4.30	15	30	36	90	326	383	472	3.62	4.26	5.25		
18	30	42	80	305	357	436	3.81	4.46	5.46	16	28	36	90	290	341	417	3.23	3.79	4.625	15	30	42	80	336	396	488	4.20	4.95	6.11		
18	30	48	75	326	383	466	4.34	5.11	6.22	16	28	42	80	300	354	432	3.75	4.425	5.40	15	30	48	75	361	425	523	4.82	5.67	6.97		
20	32	36	90	353	414	506	3.92	4.61	5.62	16	28	48	75	322	379	462	4.30	5.05	6.16	16	32	36	90	368	434	534	4.08	4.83	5.94		
20	32	42	80	366	428	525	4.575	5.36	6.56	17	30	42	80	343	400	492.	4.29	5.00	6.14	16	32	42	80	382	449	555	4.77	5.61	6.94		
20	32	48	75	393	462	574	5.24	6.16	7.66	17	30	48	75	367	428	527	4.89	5.71	7.03	16	32	48	75	410	483	595	5.47	6.45	7.92		
22	36	42	80	450	530	643	5.625	6.625	8.05	18	32	42	80	385	452	552	4.81	5.65	6.90	18	36	42	80	483	569	702	6.05	7.11	8.76		
22	36	48	75	483	568	690	6.45	7.560	9.20	18	32	48	75	413	484	592	5.50	6.45	7.90	18	36	48	75	519	610	753	6.92	8.13	10.04		
24	40	42	80	524	615	750	6.55	7.680	9.36	19	34	42	80	430	506	617	5.37	6.32	7.71	20	40	42	80	577	680	838	7.21	8.50	10.48		
24	40	48	75	580	681	831	7.725	9.08	11.05	19	34	48	75	460	542	662	6.13	7.22	8.80	20	40	48	75	642	754	930	8.57	10.04	12.40		
26	44	48	75	686	807	980	9.80	10.75	13.05	20	36	42	80	477	561	685	5.96	7.01	8.56	22	44	42	80	724	852	1,050	9.05	10.64	13.13		
26	44	60	65	743	875	1,060	11.43	13.45	16.30	20	36	48	75	512	602	735	6.83	8.03	9.80	22	44	48	75	776	914	1,125	10.36	12.20	15.00		
28	48	48	70	768	902	1,100	10.98	12.9	15.70	22	40	48	75	522	622	726	7.01	8.08	9.68	22	44	60	65	840	988	1,220	12.93	15.20	18.75		
28	48	60	65	893	1,050	1,280	13.73	16.15	19.70	22	40	60	65	676	790	970	10.40	12.15	14.92	24	48	48	70	861	1,013	1,250	12.32	14.48	17.85		
30	50	48	70	846	992	1,210	12.08	14.15	17.30	24	44	48	75	750	874	1,076	10.00	11.65	14.30	24	48	60	60	902	1,069	1,310	15.04	17.65	21.85		
30	50	60	60	907	1,064	1,295	15.11	17.75	21.59	24	44	60	65	812	947	1,165	12.50	14.55	17.90	26	52	60	60	1,081	1,273	1,570	18.00	21.20	26.20		
32	54	60	60	1,040	1,225	1,480	17.33	20.40	24.69	26	48	48	75	857	1,001	1,240	11.42	13.40	16.50	26	52	66	55	1,092	1,282	1,585	19.90	23.30	28.80		
32	54	66	55	1,050	1,232	1,500	19.10	22.40	27.26	26	48	60	65	952	1,114	1,388	14.65	17.13	21.35	26	52	72	50	1,081	1,273	1,570	21.65	25.45	31.40		

The above standard cylinder ratios are given for the average mill conditions, but we are prepared to supply engines at any ratio special service or conditions may make desirable.

GARDNER GOVERNORS.

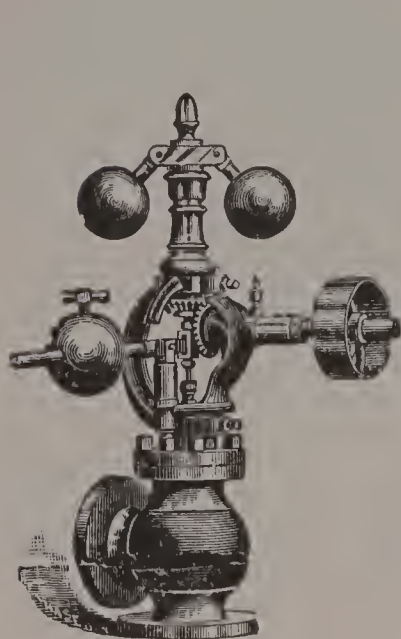


Figure 40.
Standard—Class A.

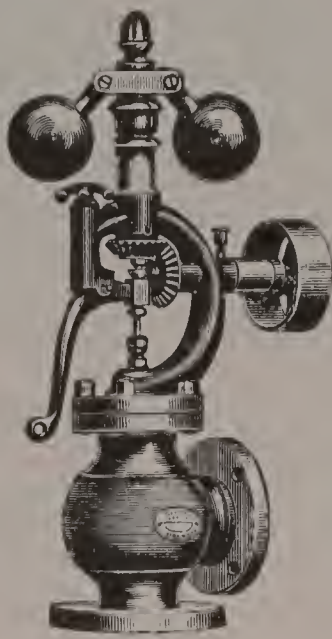


Figure 41.
Standard—Class B.

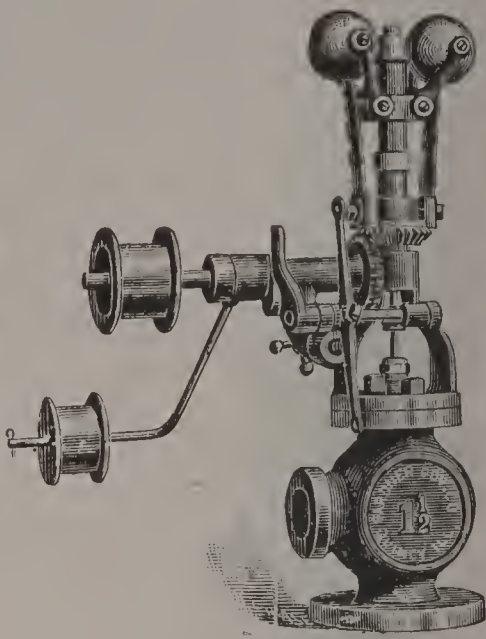


Figure 42.
Spring—Class A.

The Gardner Governors are made in two styles, the Standard and Spring.
The Standard is recommended for slow and medium speed, and the Spring for high speed and portable engines.

PRICE LIST.

Size of Governor— Diameter of Opening.	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Price, Class B, Plain . . .	\$16.00	\$18.00	\$21.00	\$25.00	\$30.00	\$35.00	\$40.00	\$50.00	\$60.00
Price, Class B, Finished	18.00	20.00	24.00	29.00	34.00	40.00	45.00	58.00	69.00
Price, Class A, Plain . . .	24.00	24.00	24.50	29.50	36.00	42.00	48.00	59.00	71.00
Price, Class A, Finished	27.00	27.00	27.50	33.50	40.00	47.00	53.00	67.00	80.00

Size of Governor— Diameter of Opening.	4	$4\frac{1}{2}$	5	6	7	8	9	10
Price, Class B, Plain . . .	\$71.00	\$83.00	\$ 94.00	\$122.00	\$150.00	\$185.00	\$215.00	\$240.00
Price, Class B, Finished	81.00	94.00	106.00	136.00	166.00	202.00	235.00	260.00
Price, Class A, Plain . . .	83.00	96.00	109.00	140.00	170.00	210.00	241.00	270.00
Price, Class A, Finished	93.00	107.00	121.00	154.00	186.00	227.00	261.00	290.00

Class B is without Automatic Stop and Class A with Automatic Stop. Prices on sizes from 12 to 16 inches inclusive will be sent on application. Standard Class A Governors are not made in sizes smaller than 1¼.

IN ORDERING.

In all orders for Governors be particular to state the size; if plain or finished; the style, Spring or Standard; the class, A or B; and the kind of openings wanted in chamber. If Class A is wanted, specify whether for horizontal or vertical engine, as a special design is necessary when wanted for vertical engine.

REPAIRS.

All Governors are made in duplicate, so that new parts can be supplied for those worn or broken. As many changes have been made in the patterns, it is always best to send broken or worn parts for duplication; but if this be not convenient, give the trade number of the Governor, which, if of the Standard style, will be found stamped upon side of the head, and if of the Spring, on the flange of the frame.

SPEED INDICATORS.

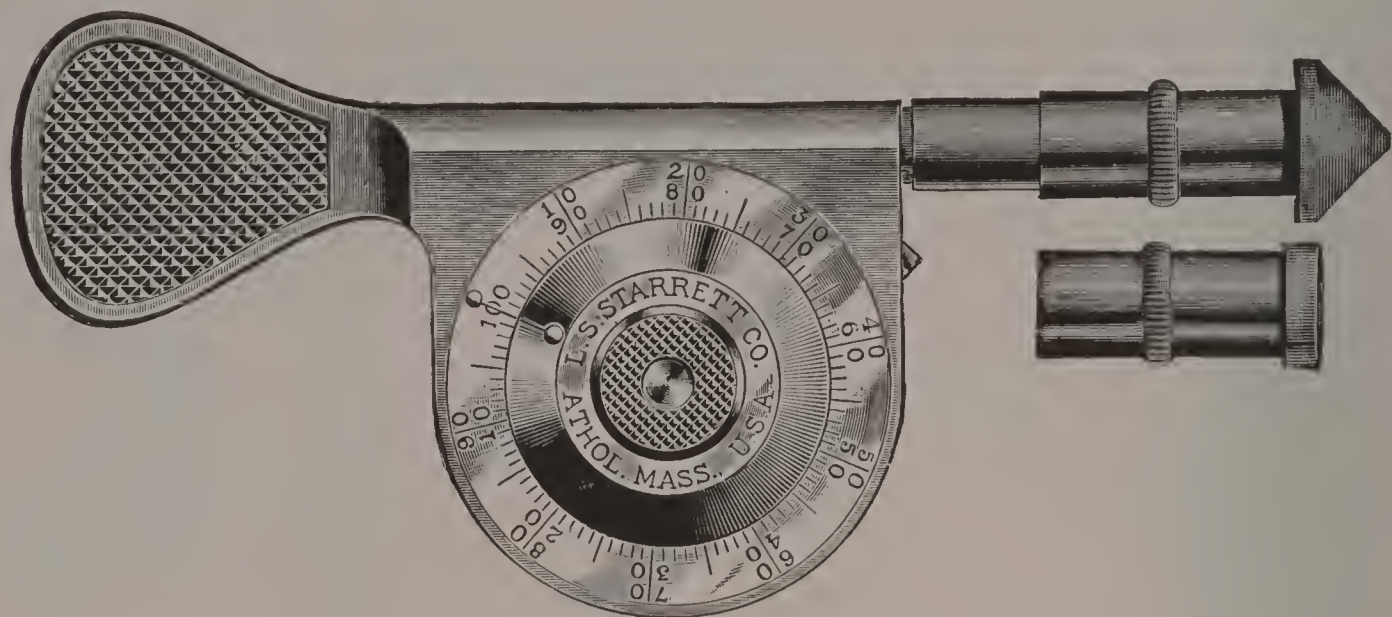


Figure 46.

STARRETT'S HIGH SPEED INDICATOR.

Price.....\$1 00 } We supply the Indicators with a spindle 7½ in. long
In Leatherette case.... 1 50 } for use on Dairy Machines, etc., for 50c. extra.

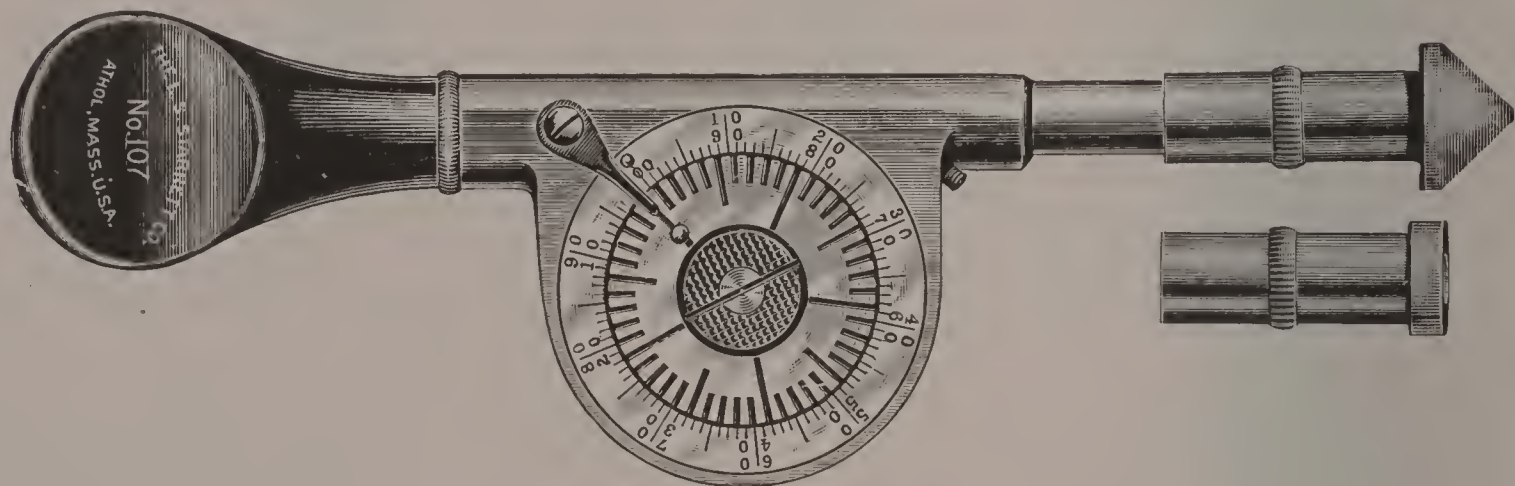


Figure 47.

STARRETT'S REGISTERING SPEED INDICATOR.

Prices: In pasteboard box.....\$3 00 In Leatherette case.....\$3 50

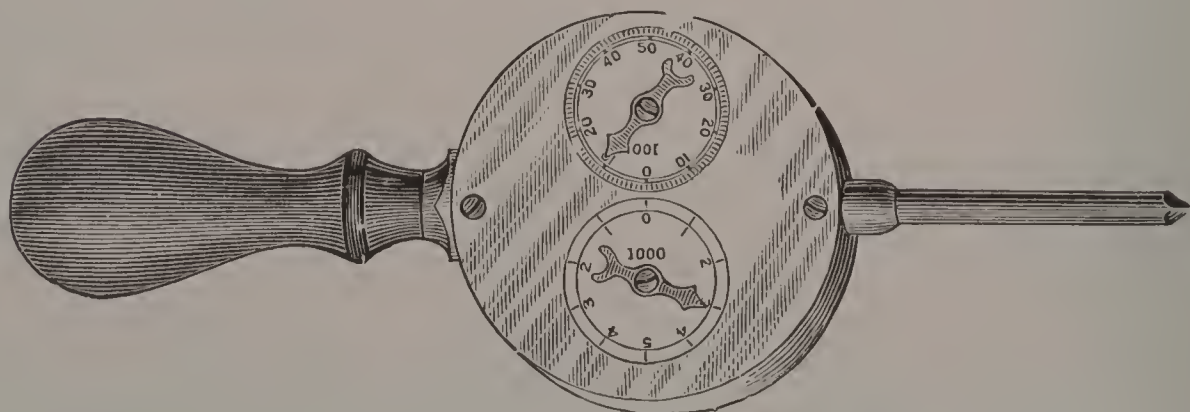


Figure 48.

TAYLOR'S SPEED INDICATOR.

Price each, \$7.00.

Have your Engine Cylinders bored by up-to-date Machines.

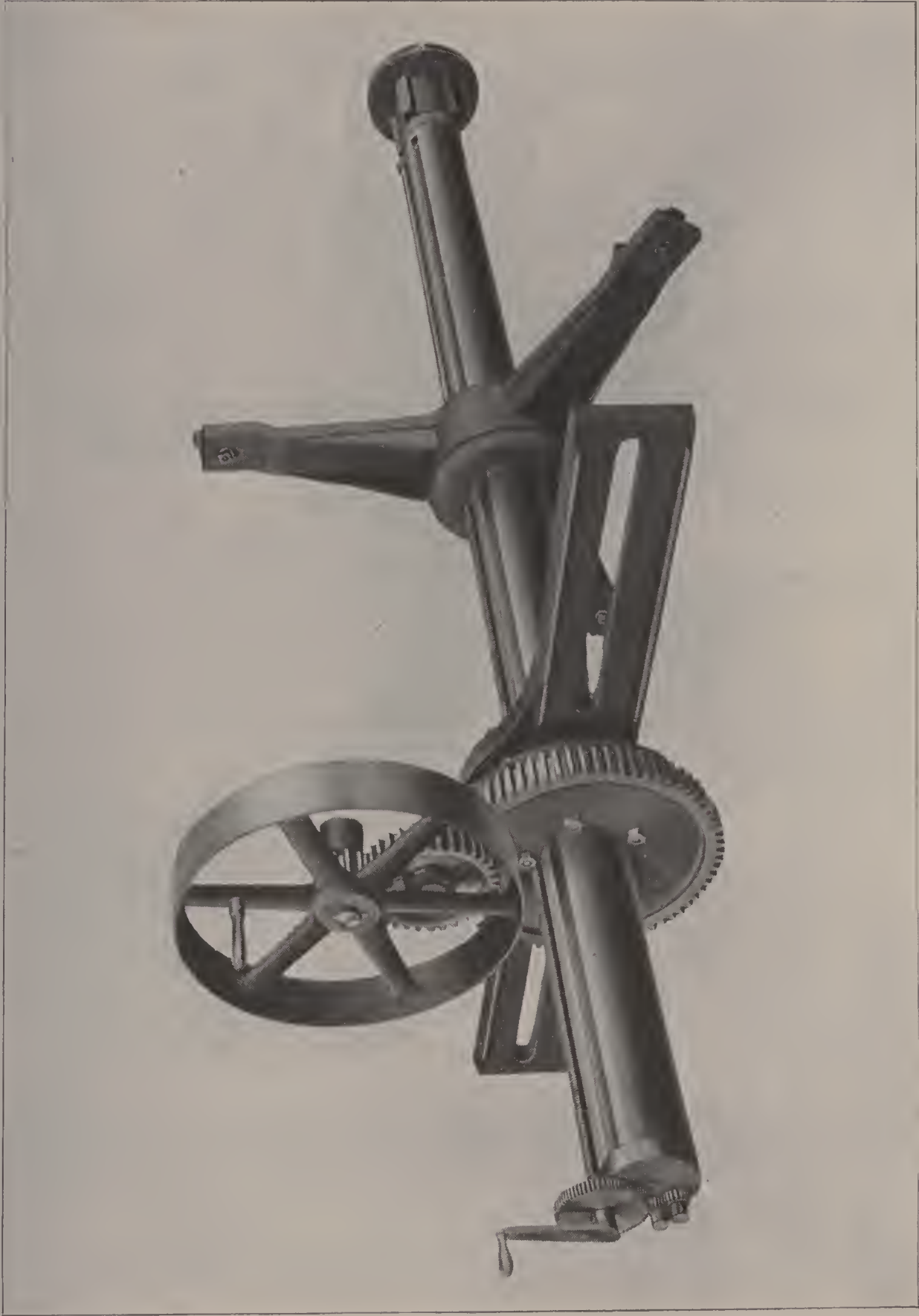


Figure 49.
Boring bar for Engine cylinders.
(Made in our shop.)

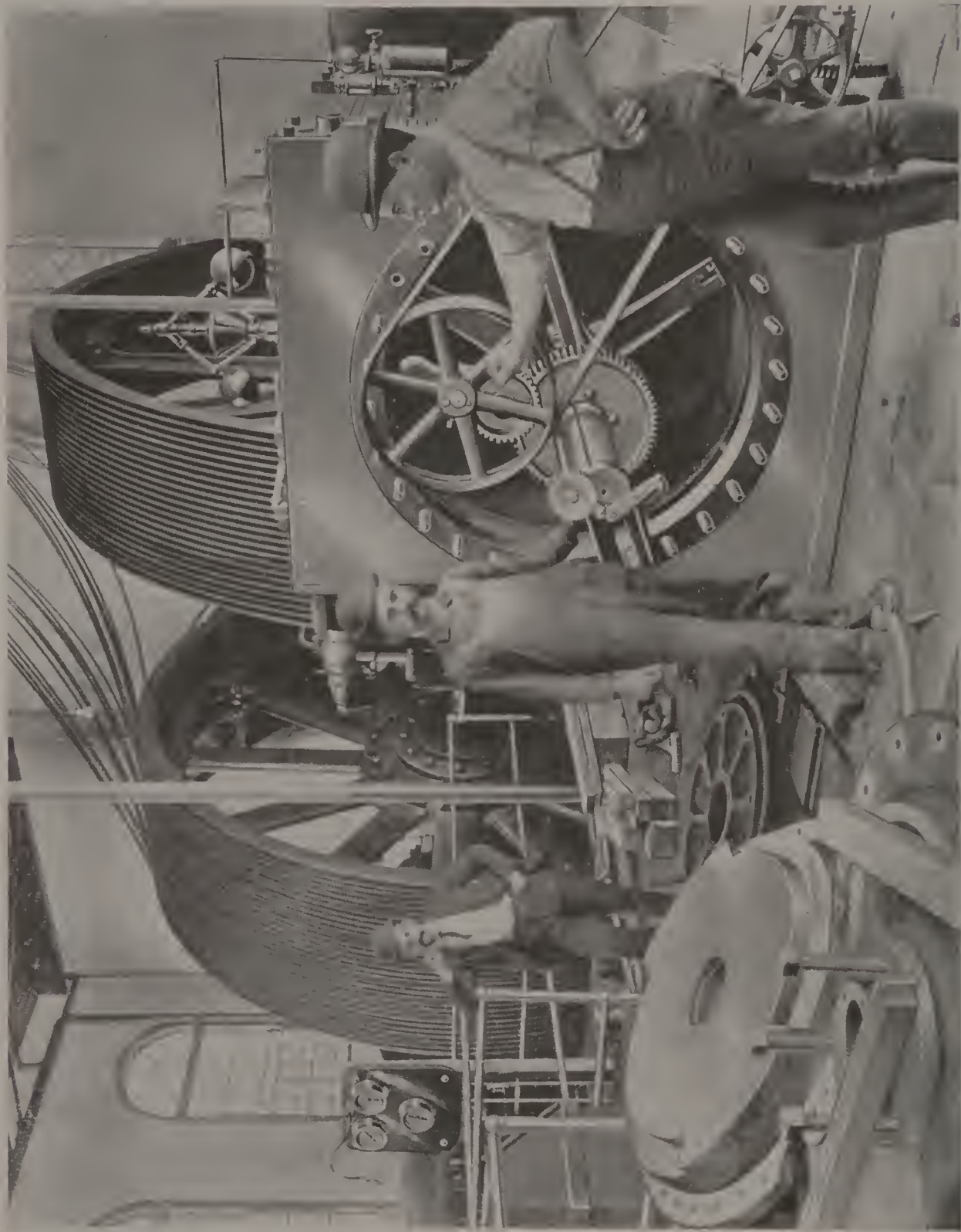


Figure 50.

One of our engine experts reboring Corliss Cylinder for Dallas Mfg. Co., Huntsville, Ala.

WE OVERHAUL ENGINES,
USING OUR
PORTABLE BORING MACHINE.

Have your cylinders bored in place, thereby saving time and expense.

The cut on the opposite page shows our Latest Improved Portable Cylinder Boring Machine, boring a cylinder 48 inches in diameter by 60 inches stroke at Dallas Mfg. Co., Huntsville, Ala. We claim this bar is a decided improvement over the many boring bars now in use, thereby insuring the accuracy of the work, and at the same time quicker in operation, which lessens the cost materially. This machine is designed for re-boring all makes and sizes of engine cylinders, pumps, Corliss valves, large wheels, etc. It will bore with one or both cylinder heads off, either vertical or horizontal. It is so constructed that the piece being bored serves as a support of the bar. It is only necessary to take off the cylinder head and remove piston, then the cylinder can rapidly and accurately be bored out. This saves breaking the steam joints, etc., and often a cylinder can be re-bored in less time than it would take to remove the cylinder from its bed.

It is absolutely necessary that the cylinder should be perfectly true with properly fitted piston therefore insuring great economy in fuel.

Piston Heads, rods and packing rings made to order.

Estimates promptly given.

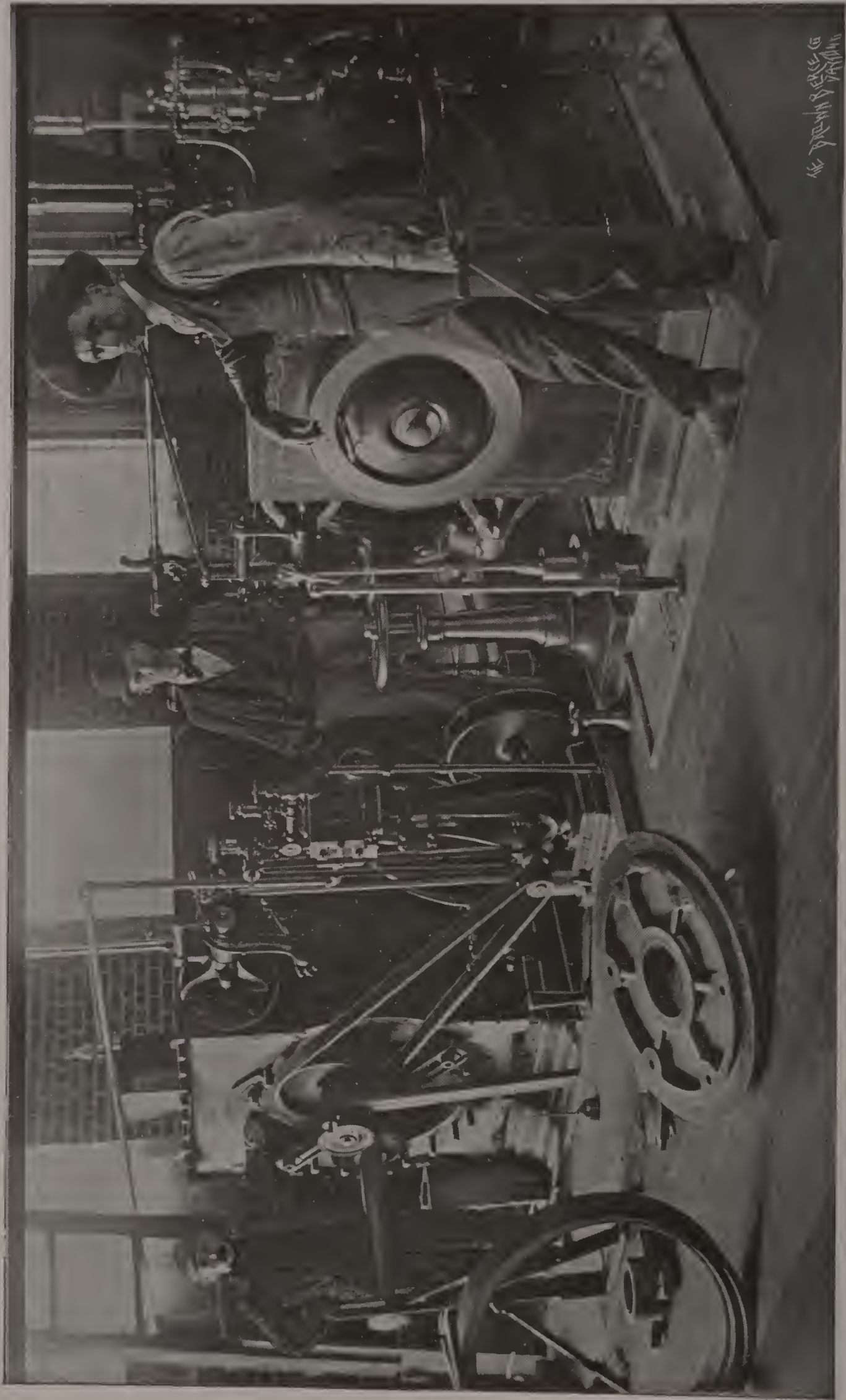


Figure 51.

One of our engine experts reboring the cylinders of a Compound Corliss Engine at Lancaster, S. C.

The D. A. Tompkins Company

Charlotte, N. C.

PUMPING MACHINERY AND
WATER WHEELS

We Make Contracts for Installation of Complete Plants : : : : :

Machine and Repair Work of Every Description

Castings

DUPLIX BOILER FEED PUMPS.

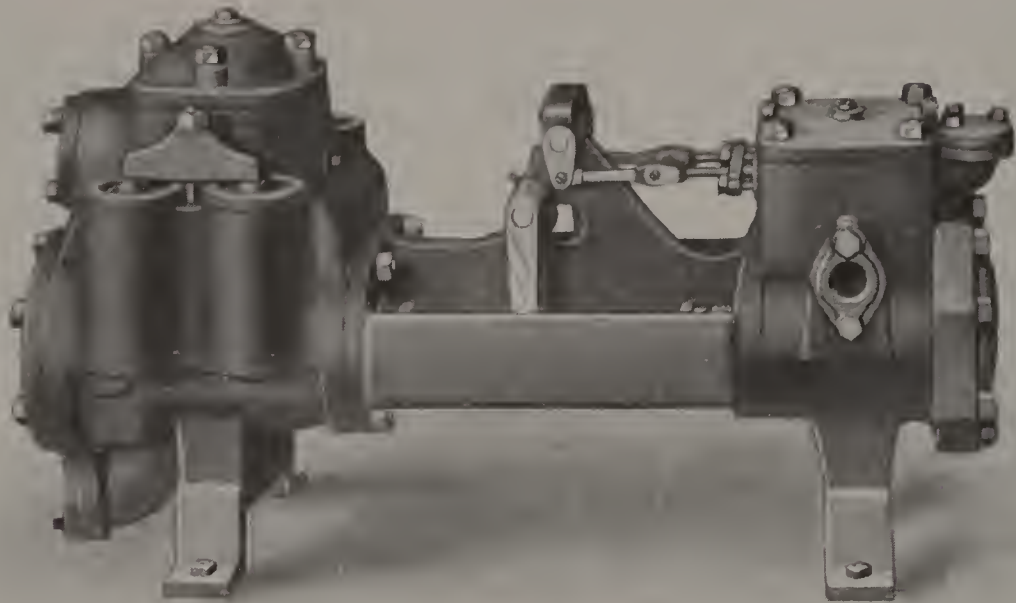


Figure 52.

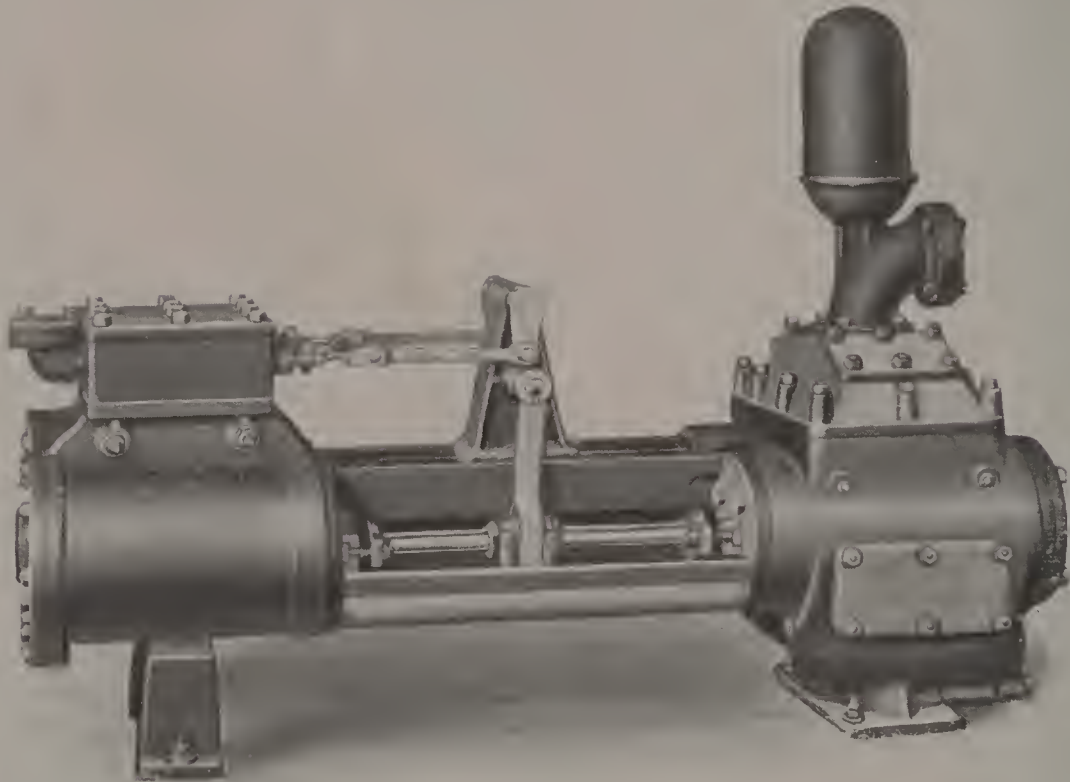


Figure 53.

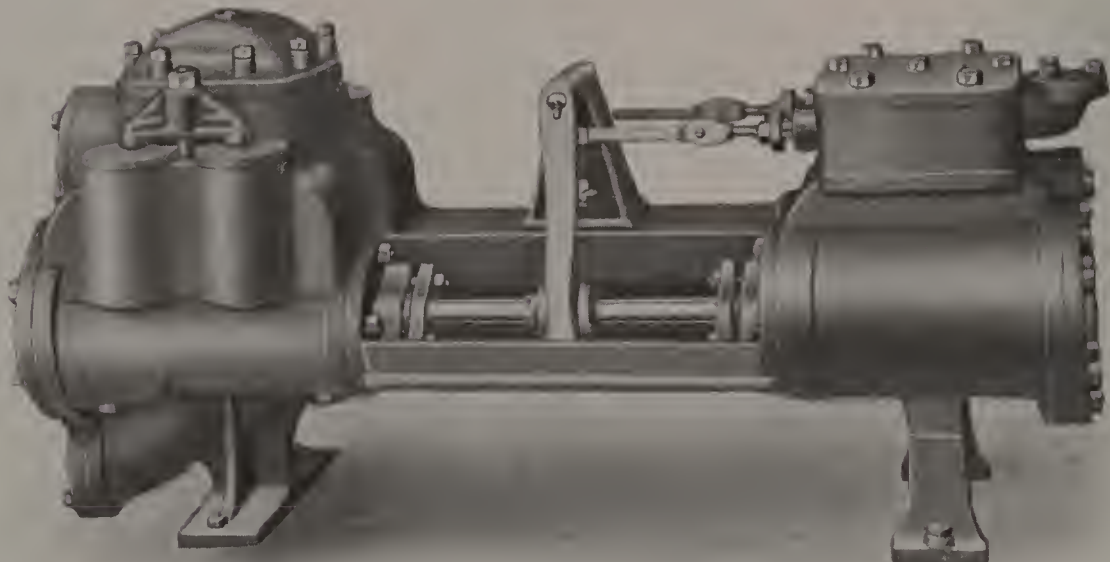


Figure 54.

Duplex Pattern.

The attention of purchasers who prefer a Duplex Pump for boiler feeding is directed to illustrations on the opposite page. We recommend the yoke box pattern for sizes 4½ x 3 x 4 to and including 8 x 5 x 10 for the reason that the suction valves can be located in separate chambers and the discharge valves immediately beneath the air dome, thus giving access to all valves without disturbing any pipe connections. This type however, is necessarily much heavier than the turret pattern.

These Boiler Feed Pumps, excepting size 3 x 2 x 4 are provided with removable water cylinders and adjustable packed water plungers giving compensation for wear.

At small additional cost we provide brass-lined water cylinders, brass piston rods and plungers. Water valves are of India rubber, composition rubber, or brass, as the service requires.

We are also prepared to equip these pumps with brass ball valves suitable for handling thick liquids and for filter press work.

Internally packed pumps of this type are suitable for 125 pounds working pressure, and are amply strong for 175 pounds, but experience indicates that the outside packed plunger type is better adapted for a continuous working pressure exceeding 125 pounds per square inch.

In determining the proper size of Boiler Feed Pumps bear in mind that slow speed is an essential factor for the best results. Thirty pounds of water per hour per horse power is the usual basis of estimate.

Sight Feed Lubricator is furnished with each pump.

Sizes 4½ x 3 x 4 to and including 8 x 5 x 10 will be furnished with yoke boxes.

Pipe openings are flanged.

Diameter of Steam Cylinders	Diameter of Water Cylinders	Stroke	Gallons per Revolution	Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe
3 in.	2 in.	4 in.	.2	1½ in.	¾ in.	1¼ in.	1 in.
4½ in.	3 in.	4 in.	.48	¾ in.	1 in.	2 in.	1½ in.
5¼ in.	3½ in.	5 in.	.8	¾ in.	1 in.	2½ in.	2 in.
6 in.	4 in.	6 in.	1.32	1 in.	1½ in.	3 in.	2 in.
7 in.	4 in.	10 in.	2.17	1¼ in.	2 in.	4 in.	3 in.
7 in.	4½ in.	10 in.	2.76	1¼ in.	2 in.	4 in.	3 in.
7 in.	5 in.	10 in.	3.4	1¼ in.	2 in.	4 in.	3 in.
8 in.	5 in.	10 in.	3.4	1½ in.	2 in.	4 in.	3 in.
10 in.	6 in.	12 in.	5.84	2 in.	2½ in.	5 in.	4 in.
12 in.	7 in.	12 in.	7.9	2½ in.	3 in.	6 in.	5 in.
12 in.	8 in.	12 in.	10.4	2½ in.	3 in.	6 in.	5 in.
14 in.	8 in.	12 in.	10.4	2½ in.	3 in.	6 in.	5 in.
14 in.	9 in.	12 in.	13.2	2½ in.	3 in.	7 in.	6 in.

TRIPLEX BOILER FEED PUMPS.

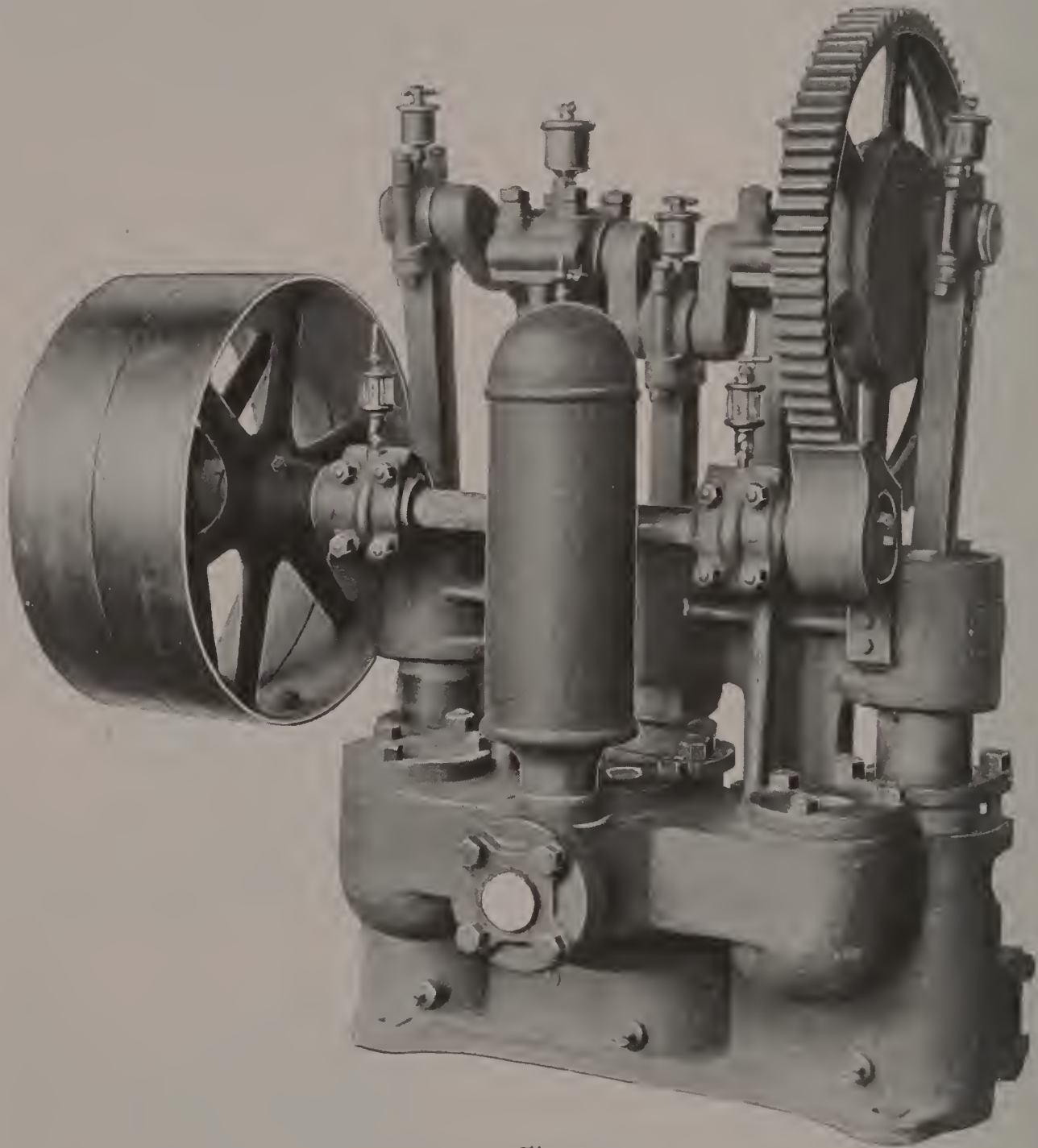


Figure 55.

Triplex Boiler Feed Pumps.

Fig. 55.

The economical operation of these pumps is assured by the fact that the same economy developed by the motive power for the entire plant is available for this pump, plus the small percentage lost in power transmission. The principle of the operation of Triplex Pumps is becoming well and favorably known. One of its three plungers is constantly exerted on a column of water, resulting in a continuous flow of the fluid. Its speed is always uniform. It will handle the hottest water easily, and its design is of the simplest.

While the speed is constant, resulting in a uniform delivery of water, it can be regulated to the needs of the boiler or boilers by means of a by-pass.

In making the pipe connections for this type of Feed Pump a relief valve should be provided on discharge to boilers and connected to the suction, so that if the discharge should be throttled the water may pass to suction and the pumps be relieved, otherwise undue pressure will quickly accumulate.

Diameter of Plungers	Stroke	Suction	Discharge	Revolutions per Minute	Gallons per Revolution	Gallons per Minute	Tight and Loose Pulley	Ratio of Gearing
1 1/4 in.	2 in.	1 in.	3/4 in.	50 to 65	.03	1.5 to 1.95	12 x 1 1/2 in.	5 to 1
1 3/4 in.	2 1/2 in.	1 1/4 in.	1 in.	50 to 65	.07	3.5 to 4.5	12 x 2 1/2 in.	5 to 1
2 in.	3 in.	1 1/2 in.	1 1/4 in.	50 to 65	.12	6. to 7.8	12 x 3 1/4 in.	5 to 1
2 1/2 in.	4 in.	1 1/2 in.	1 1/2 in.	50 to 65	.25	12.5 to 16.2	15 x 3 1/4 in.	5 to 1
3 in.	4 in.	2 in.	1 1/2 in.	50 to 65	.36	18. to 23.4	16 x 4 1/4 in.	5 to 1
4 in.	4 in.	3 in.	2 1/2 in.	50 to 65	.65	32.5 to 42.2	18 x 4 1/2 in.	5 to 1
5 1/2 in.	6 in.	3 in.	2 1/2 in.	40 to 60	1.	40. to 60.	20 x 4 1/2 in.	5 to 1
5 1/2 in.	6 in.	4 in.	3 in.	40 to 60	1.85	74. to 111.	24 x 5 in.	5 to 1
5 1/2 in.	8 in.	4 in.	3 in.	40 to 60	2.46	98. to 147.	28 x 6 in.	5 to 1

Table of Horse-Power Required to Operate Triplex Pump.

Size of Pump.	Revolutions per Minute.	Capacity Gallons per Minute.	HORSE-POWER.						
			50-Feet Head.	100-Feet Head.	150-Feet Head.	200-Feet Head.	250-Feet Head.	300-Feet Head.	
1 1/4 x 2	65	1.95	.08	.16	.20	.26	.30	.34	
1 3/4 x 2 1/2	65	4.5	.16	.32	.40	.48	.56	.62	
2 x 3	65	7.8	.3	.5	.7	.9	1.1	1.2	
2 1/2 x 4	65	16.2	.4	.8	1.2	1.4	1.8	2.0	
3 x 4	65	23.4	.7	1.0	1.5	2.00	2.5	3.0	
4 x 4	65	42.2	1.00	2.00	3.00	4.00	5.0	5.5	
4 x 6	60	60.0	1.5	2.50	3.50	4.5	5.5	6.0	
5 1/2 x 6	60	111.0	3.00	5.00	6.00	8.5	10.5	11.5	
5 1/2 x 8	60	147.6	4.5	7.5	9.00	11.0	13.00	14.00	
7 x 8	60	240.0	6.00	10.00	14.00	17.5	22.00	23.5	
8 x 8	60	312.0	8.0	15.0	17.0	21.0	26.05	28.5	
8 x 10	55	357.5	9.00	17.5	20.0	25.0	31.0	33.0	
9 x 10	55	451.0	11.5	22.5	25.0	34.0	39.0	42.	
9 x 12	50	495.0	12.5	25.	28.5	37.5	44.	47.	
10 x 12	50	610.0	15.	30.	34.5	45.	47.5	57.	

The Theoretical H. P. required to elevate water is found by multiplying the gallons pumped per minute by the total lift (including friction) in feet, and dividing by 4,000 The actual H. P. for 100 feet lift is 1.7 times the Theoretical; for 200 feet lift is 1.45 times, and for 300 feet lift 1.25 times for Triplex Pumps.

PUMP REPAIRS.

We are excellently equipped for repairing pumps and on short notice will overhaul and put in first-class condition any pumps sent to us or will cast new parts and ship in a few days after receipt of order.

Pipe, valves, fittings, lubricators, etc.

Carried in stock.

Machine and Repair Work of every
Description.

Castings.

Duplex Pumps.

Standard Pattern.

Each cylinder gives a bearing surface for the full length of the plunger's stroke. In addition, the cylinder can be removed, re-bored or re-newed, if necessary, when worn. Taken in connection with adjustable fibrous packed plunger piston more perfect adjustment for wear can be made than by any other device on the market. Bronze lined cylinders, brass plungers and rods at small additional cost.

Diameter of Steam Cylinders	Diameter of Water Cylinders	Stroke	Gal. per Stroke, One Piston	Strokes per Minute.	Gallons per Minute	Steam Pipe	Exhaust Pipe	Suction Pipe.	Discharge Pipe
3 in.	2 in.	4 in.	.05	100	10	½ in.	¾ in.	1¼ in.	1 in.
4½ in.	3 in.	4 in.	.12	100	24	¾ in.	1 in.	2 in.	1½ in.
5¼ in.	3½ in.	5 in.	.20	100	40	¾ in.	1¼ in.	2½ in.	2 in.
6 in.	4 in.	6 in.	.32	100	64	1 in.	1½ in.	3 in.	2 in.
7 in.	4½ in.	10 in.	.54	100	108	1¼ in.	2 in.	4 in.	3 in.
7 in.	5 in.	10 in.	.68	100	132	1¼ in.	2 in.	4 in.	3 in.
7 in.	5 in.	10 in.	.85	100	170	1¼ in.	2 in.	4 in.	3 in.
7 in.	6 in.	10 in.	1.22	100	244	1¼ in.	2 in.	5 in.	4 in.
8 in.	4½ in.	10 in.	.68	100	132	1½ in.	2 in.	4 in.	3 in.
8 in.	5 in.	10 in.	.85	100	170	1½ in.	2 in.	4 in.	3 in.
8 in.	6 in.	10 in.	1.22	100	244	1½ in.	2 in.	5 in.	4 in.
8 in.	7 in.	10 in.	1.66	100	332	1½ in.	2 in.	6 in.	5 in.
10 in.	5 in.	12 in.	1.02	100	204	2 in.	2½ in.	4 in.	3 in.
10 in.	6 in.	12 in.	1.46	100	292	2 in.	2½ in.	5 in.	4 in.
10 in.	7 in.	12 in.	1.99	100	398	2 in.	2½ in.	6 in.	5 in.
12 in.	8 in.	12 in.	2.61	100	522	2 in.	2½ in.	6 in.	5 in.
12 in.	6 in.	12 in.	1.46	100	292	2½ in.	3 in.	5 in.	4 in.
12 in.	7 in.	12 in.	1.99	100	398	2½ in.	3 in.	6 in.	5 in.
12 in.	8 in.	12 in.	2.61	100	522	2½ in.	3 in.	6 in.	5 in.
12 in.	9 in.	12 in.	3.30	100	660	2½ in.	3 in.	7 in.	6 in.
14 in.	7 in.	12 in.	4.08	100	816	2½ in.	3 in.	8 in.	7 in.
14 in.	8 in.	12 in.	1.99	100	398	2½ in.	3 in.	6 in.	5 in.
14 in.	9 in.	12 in.	2.61	100	522	2½ in.	3 in.	6 in.	5 in.
14 in.	10 in.	12 in.	3.30	100	660	2½ in.	3 in.	7 in.	6 in.
14 in.	11 in.	12 in.	4.08	100	816	2½ in.	3 in.	8 in.	7 in.
16 in.	8 in.	12 in.	4.93	100	986	2½ in.	3 in.	10 in.	8 in.
16 in.	9 in.	12 in.	2.61	100	522	3 in.	4 in.	6 in.	5 in.
16 in.	10 in.	12 in.	3.30	100	660	3 in.	4 in.	7 in.	6 in.
16 in.	11 in.	12 in.	4.08	100	816	3 in.	4 in.	8 in.	7 in.
16 in.	12 in.	12 in.	4.93	100	986	3 in.	4 in.	10 in.	8 in.
18 in.	10 in.	12 in.	5.87	100	1174	3 in.	4 in.	10 in.	8 in.
18 in.	11 in.	12 in.	4.93	100	986	3 in.	4 in.	12 in.	10 in.
18 in.	12 in.	12 in.	5.87	100	1174	3 in.	4 in.	12 in.	10 in.
20 in.	14 in.	15 in.	7.99	80	1598	4 in.	6 in.	10 in.	8 in.
20 in.	11 in.	15 in.	6.17	80	987	4 in.	6 in.	10 in.	8 in.
20 in.	12 in.	15 in.	7.34	80	1174	4 in.	6 in.	12 in.	10 in.
20 in.	14 in.	15 in.	9.99	80	1598	4 in.	6 in.	12 in.	10 in.
20 in.	15 in.	15 in.	11.00	80	1760	4 in.	6 in.	14 in.	12 in.

The diameters of suction and discharge flanges given above are for short lengths of pipe only and low lifts. If the suction and discharge mains are long, or the suction lift high, the diameter of pipes must be increased. A suction air or vacuum chamber materially assists in the smooth operation of the pump.

ARTESIAN WELL ENGINE
OR
DEEP WELL PUMP.



Figure 56.

Long Stroke Pattern.

A prominent feature is the combined water box and base, which not only provides a substantial foundation, but offers a subsiding chamber for the water, and relieves to a great extent the objectionable water hammer. The housing is cast entirely separate from the base, and is readily tipped back, giving ample opportunity to withdraw rods, plunger and cylinder.

Engines are provided with tappet valve movement, adjustable on the outside. Auxiliary plunger is provided with expansion rings. The steam chest is placed at the lower extremity of the cylinder, and inasmuch as steam is used almost exclusively on the upward stroke, length of ports has been greatly reduced.

Differential plunger will be provided for the base at additional cost, if desired.
We recommend ash plunger rods with wrought iron couplings in every instance.

Diameter of Steam Cylinder	Stroke	Steam Pipe	Exhaust Pipe	Opening in Base for Well Pipe	Opening in Base for Discharge	Adapted for Size Cylinder
6 in.	18 in.	1 in.	1 1/4 in.	4 3/4 in.	4 in.	3 1/4 x 18 to 4 3/4 x 18
6 in.	24 in.	1 in.	1 1/4 in.	4 3/4 in.	4 in.	3 1/4 x 24 to 4 3/4 x 24
7 1/2 in.	24 in.	1 in.	2 in.	7 3/4 in.	6 in.	3 3/4 x 24 to 5 3/4 x 24
7 1/2 in.	30 in.	1 in.	2 in.	7 3/4 in.	6 in.	3 3/4 x 30 to 5 3/4 x 30
9 1/2 in.	30 in.	1 1/4 in.	2 1/2 in.	7 3/4 in.	6 in.	4 3/4 x 30 to 7 3/4 x 30
9 1/2 in.	36 in.	1 1/4 in.	2 1/2 in.	7 3/4 in.	6 in.	4 3/4 x 36 to 7 3/4 x 36
11 in.	30 in.	1 1/2 in.	2 1/2 in.	7 3/4 in.	6 in.	Special
11 in.	36 in.	2 in.	3 in.	7 3/4 in.	6 in.	Special
12 in.	36 in.	2 in.	3 in.	7 3/4 in.	6 in.	Special
13 1/2 in.	36 in.	2 in.	3 in.	7 3/4 in.	6 in.	Special

DEEP WELL PUMPS.
FOR HAND USE.

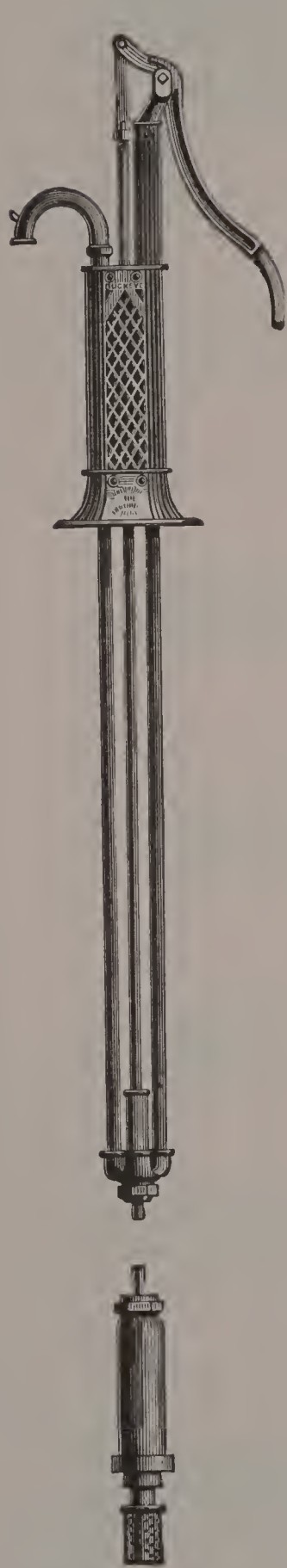


Figure 57.
Plain.



Figure 58.



Figure 59.
With 3 way Cock.

DEEP WELL PUMPS.

FOR HAND USE.

Represented by Figs. 57, 58 and 59, on opposite page.

For Wells From 30 to 40 Feet Deep.

	Plain.	With 3-way Cock.
With 4 in. porcelain-lined lower cylinder.....	\$19 50	\$22 00
With 3½ in. porcelain-lined lower cylinder.....	17 00	19 50
With 3½x13 in. brass cylinder.....	18 00	20 50

For Wells From 30 to 70 Feet Deep.

With 3 in. porcelain-lined lower cylinder.....	\$15 00	\$17 00
With 3x13 in. brass cylinder.....	16 00	18 00
With 3x18 in. brass cylinder.....	17 50	19 50
With 2½ in. porcelain-lined lower cylinder.....	15 00	17 00
With 2½x13 in. brass cylinder.....	16 00	18 00
With 2½x18 in. brass cylinder.....	17 50	19 50

For Wells Over 70 Feet Deep.

With 2¼ in. porcelain-lined lower cylinder.....	\$15 00	\$17 00
With 2¼x13 in. brass cylinder.....	16 00	18 00
With 2¼x18 in. brass cylinder.....	17 50	19 50

NOTE.—All 3 inch Cylinders, or smaller, fitted for 1¼ inch Pipe. All 3½ inch Cylinders fitter for 1½ inch Pipe. All 4 inch Cylinders fitted for 2 inch Pipe.

All Pumps are priced without Suction Pipe. If Pipe is wanted, state so in order, giving depth from top of platform to bottom of well, and depth of water in well in dry season.

AUTOMATIC RECEIVER AND FEED PUMP.

The combined Automatic Receiver and Feed Pump is designed primarily to drain heating systems and automatically deliver to the boilers the water of condensation in its hottest condition. It is, therefore, a necessary and economical apparatus for office buildings, hotels, apartment houses, factories, etc. It is also a valuable auxiliary in connection with oil refineries, brick yards, chemical laboratories, etc.

Its operation is entirely automatic, being placed in a position to receive by gravity the condensed water from the entire system for which it is operating, and as the returns accumulate in the receiver the float located therein gradually raises and opens a special valve, admitting live steam to the steam chest of pump. As soon as the receiver is relieved of its condensed water the pump gradually ceases to operate, and does not resume until water again accumulates.

Both receiver and pump are mounted on a cast-iron base, the height of receiver being restricted so that it affords a drain for the lowest pipe or radiator.

Should the pump be desired as the sole means of feeding the boilers a sufficient quantity of cold water may be introduced directly into the receiver to supply the deficiency occasioned by leakage, etc.

It will be observed, therefore, that this apparatus is desirable and economical in the highest degree, not only on account of the direct saving effected, but it relieves the system of ever accumulating condensation, returning it directly to the boilers at a temperature closely approximating the boiling point, and also relieves the radiators, coils, etc., of that objectionable hammer due to the presence of entrained water.

Size Pump.	Capacity per Minute.	Square Feet of Heating Surface it will Drain
3 x 2 x 4	12 Gallons	5,000
4½ x 3 x 4	20 "	10,000
5¼ x 3½ x 5	35 "	20,000
6 x 4 x 6	60 "	40,000
7 x 4½ x 10	100 "	80,000

Combined Jet Condensers and Air Pumps.

Single Cylinder Type.

The economy resulting from the use of condensing apparatus accrues through the reduction of the amount of steam consumed by the engine, or engines, in combination with each condenser apparatus; that is, less water is evaporated by the boilers, and as a consequence a reduced fuel bill; or an increased power may be obtained with the same consumption of fuel; or the advantage may be jointly applied to give increase of energy and reduction of fuel consumption.

Jet Condenser may be used with advantage under conditions where the supply of condensing water is fresh and of a quality proper for boiler feeding purposes, or where the water supply is impregnated with earthy salts or salt water, a good quality of water for boiler feeding being available from other sources; also where the necessary condensing water can be obtained without other than first cost. The economy obtained from the use of condensing apparatus in order to nearly approach the net results of a theoretical estimate is in a great measure dependent upon the efficiency of the apparatus. A high and constant vacuum must be maintained at a minimum of cost. The apparatus must be simple in construction, requiring but little attention, and have the smallest number of working parts to keep in order or replace.

Regularity of stroke is an essential requirement. In order to insure uniformity of motion the clearances in the air pump must be reduced to a minimum, so that the vapor passing over with the steam may be expelled with each stroke. The reduced clearances possible in the single cylinder air pump, together with its reliability of stroke, render this type much more efficient than the duplex pattern, and for that reason we recommend it.

This Jet Condenser is provided with an improved distributing valve. It regulates the intruding injection water in such a manner as to thoroughly distribute and form the same to the best advantage for absorbing the heat from the steam to be condensed by the use of the least possible quantity of water, and the water of condensation, together with the vapor, is carried to the air pump and discharged into the hot well.

We are prepared to furnish the duplex pattern to those who prefer that style

Diameter of Steam Cylinder	Diameter of Air Cylinder	Stroke	Steam Pipe	Exhaust Pipe	Discharge Pipe	Injection	Stroke per Minute	Maximum Steam Condensed per Hour in Pounds
3 in.	4 in.	7 in.	1½ in.	¾ in.	2 in.	1½ in.	80	375
4 in.	5 in.	7 in.	¾ in.	1 in.	2½ in.	2 in.	80	600
5¼ in.	7 in.	7 in.	1 in.	1½ in.	3½ in.	2½ in.	80	1100
5½ in.	8½ in.	10 in.	1 in.	1½ in.	4 in.	3 in.	75	2250
6½ in.	8½ in.	10 in.	1 in.	1½ in.	4 in.	3 in.	75	2250
6½ in.	10 in.	12 in.	1 in.	1½ in.	5 in.	4 in.	75	3500
7½ in.	10 in.	12 in.	1¼ in.	2 in.	5 in.	4 in.	75	3500
7½ in.	12 in.	12 in.	1¼ in.	2 in.	6 in.	5 in.	75	5000
9½ in.	12 in.	12 in.	1½ in.	2 in.	6 in.	5 in.	75	5000
9½ in.	12 in.	18 in.	1½ in.	2 in.	6 in.	5 in.	55	5750
9½ in.	14 in.	18 in.	1½ in.	2 in.	8 in.	6 in.	55	7000
11 in.	14 in.	18 in.	2 in.	3 in.	8 in.	6 in.	55	7000
9½ in.	16 in.	18 in.	1½ in.	2 in.	8 in.	6 in.	55	9000
11 in.	16 in.	18 in.	2 in.	3 in.	10 in.	8 in.	55	9000
11 in.	18 in.	18 in.	2 in.	3 in.	10 in.	8 in.	55	11000
13½ in.	18 in.	18 in.	2½ in.	3 in.	10 in.	8 in.	55	11000
13½ in.	20 in.	18 in.	2½ in.	3 in.	12 in.	10 in.	55	14500
13½ in.	22 in.	24 in.	2½ in.	3 in.	12 in.	10 in.	45	17000
13½ in.	24 in.	24 in.	2½ in.	3 in.	12 in.	10 in.	45	20000

DIRECTIONS FOR SETTING AND OPERATING PUMPS.

It should be the first care in installing the pump, to provide for full and constant supply of liquid to be pumped; in order to accomplish this observe the following points:

The suction pipe should under no circumstances be of smaller size than given in the tables. Where necessary to employ long lines, larger sizes must be used, as the frictional resistance due to the unusual length will partly counterbalance the head due to vacuum, and prevent an adequate supply to the pump.

Use as few T's and L's as possible.

All valves employed should be of the gate pattern, so that the free way for the passage water may equal that of the pipe.

In laying your suction line, a uniform grade should be maintained, in order to avoid air pockets. The suction line should have a drop not less than six inches in each one hundred feet towards the supply. Extreme care should be exercised, in order to make the suction line and connections absolutely tight. It should be remembered that a very small leak will supply the pump with quantity of air that little or no water could be obtained. It is desirable, therefore, that the suction line be tested under water pressure of from 25 to 50 pounds per square inch, in order that any leaks may be detected.

A large vacuum or suction chamber on the suction pipe, placed on the opposite side of the pump from where the suction enters, or on the line near the pump will be found of great advantage, and in case of long pipe and high lift, it is a necessity.

A foot valve can be employed to advantage, if its location is such as to enable it to be drained in cold weather, so that no danger will result from freezing. The valve will insure quick starting of the pump by maintaining the suction line free from air and full of water.

A strainer is desirable, and is absolutely essential if the supply is taken from a point that may permit the entrance of foreign matter that will have a tendency to clog the water passages and valves of the pump. The area of the openings of the strainer should be four times the area of the suction pipe; and they should be frequently inspected, and all extraneous matter removed.

Priming pipes are desirable, connected to the discharge above the pump, so that the water boxes can be filled with water and started quickly. This is especially desirable, and a necessity for a fire pump.

When hot water is to be pumped, the difficulty of lifting by suction increases with the temperature. It should therefore be arranged to flow into the pump, if so hot as to vaporize when the pressure of the atmosphere is removed. Thick liquids should also flow to the pump by gravitation.

The steam and exhaust pipes should be as direct and as free from L's as possible. Both pipes should be thoroughly cleaned before starting the pump, so that metal chips from cutting pipe may not be carried into the steam chest and score the valves and seats. Proper allowance should be made for the expansion of the steam pipes in connecting same up.

A drain pipe or bleeder should be provided for live steam pipe; connection being made directly above throttle valve and with the drain, so that the water of condensation may not have to pass through the pump.

All cocks and drains provided for both steam and water ends should be opened after the pump ceases operation, so that the water may be thoroughly drained, thereby avoiding any possibility of freezing.

If it is desirable to connect the steam and water cylinder drips in the same pipe, a check valve must be placed, closing toward the water cylinder, to keep it free from steam.

All pipes leading to and from the pump should be properly supported, to avoid undue strain on flanges of pump.

In starting a pump under heavy pressure it may fail to perform, because of full pressure resting on discharge valves. You will discover that the air in pump cylinder is compressed, and prevents water from entering; it is therefore advisable to start the pump without any pressure and run until all the air is expelled. This can be accomplished by suitable connection in pipe and waste pipe.

In starting a new pump, if it does not operate with uniform and smooth motion, usually the first impression is that the steam valves are not properly set. These valves should be the last thing to be disturbed; make sure that the suction and discharge connections, water valves, and everything connected with the water end is all right before investigating steam end. There is only one proper position for the steam valves on Duplex Pump, and this position is given them in testing room, and any changes made by the operator will be wrong.

If on starting a pump it is found that one or perhaps both the pistons do not make full stroke, the cause can usually be located at the stuffing boxes. They are probably packed too tight. In properly packed stuffing boxes it is only necessary to draw lightly on the glands to prevent leakage, thereby not only saving friction, but having a much smoother working pump.

When the water plungers are packed with fibrous packing, the trouble sometimes arises from the swelling of the packing, causing the pump to operate stiffly, and make uneven strokes, etc. This is especially so when pumping hot liquids, and sometimes it is necessary to take out the packing and thin it down. This is done by stripping a layer from one side of the strand or ring, as the swelling is usually lateral. In providing a piston with new packing, it is well to soak the packing in warm water over night before fitting it in. New packing should not be crowded into the piston, but should fit the packing space loosely, and when it becomes wet the swelling will cause it to fit in the space.

In feeding a boiler or battery of boilers the discharge pipe should be provided with a relief valve, so that if the pipe is throttled in any way the pump may be relieved; otherwise excessive pressure will quickly accumulate. Such relief is absolutely necessary for power pumps. The excess of water may be by-passed to the suction, or delivered to waste pipe.



WATER WHEELS.

WE are prepared to give advice on the availability of water powers, to estimate their capacity, engineer their development, and furnish estimates on the cost of installing Water Power Plants.

Parties writing us on this subject should give us the following information :

1. POWER REQUIRED, stating for what purpose the wheels are to be installed, that is, for cotton mills, electric lighting plant, etc.
2. APPROXIMATE SPEED desired for head shaft.
3. AVAILABLE PRESSURE OR HEAD in feet; that is, the elevation of head water above tail water.
4. AVAILABLE QUANTITY of water in cubic feet or gallons per minute.
5. VARIATION OF WATER SUPPLY in different seasons.

HIGH CLASS WATER WHEELS
FOR POWER PLANTS.

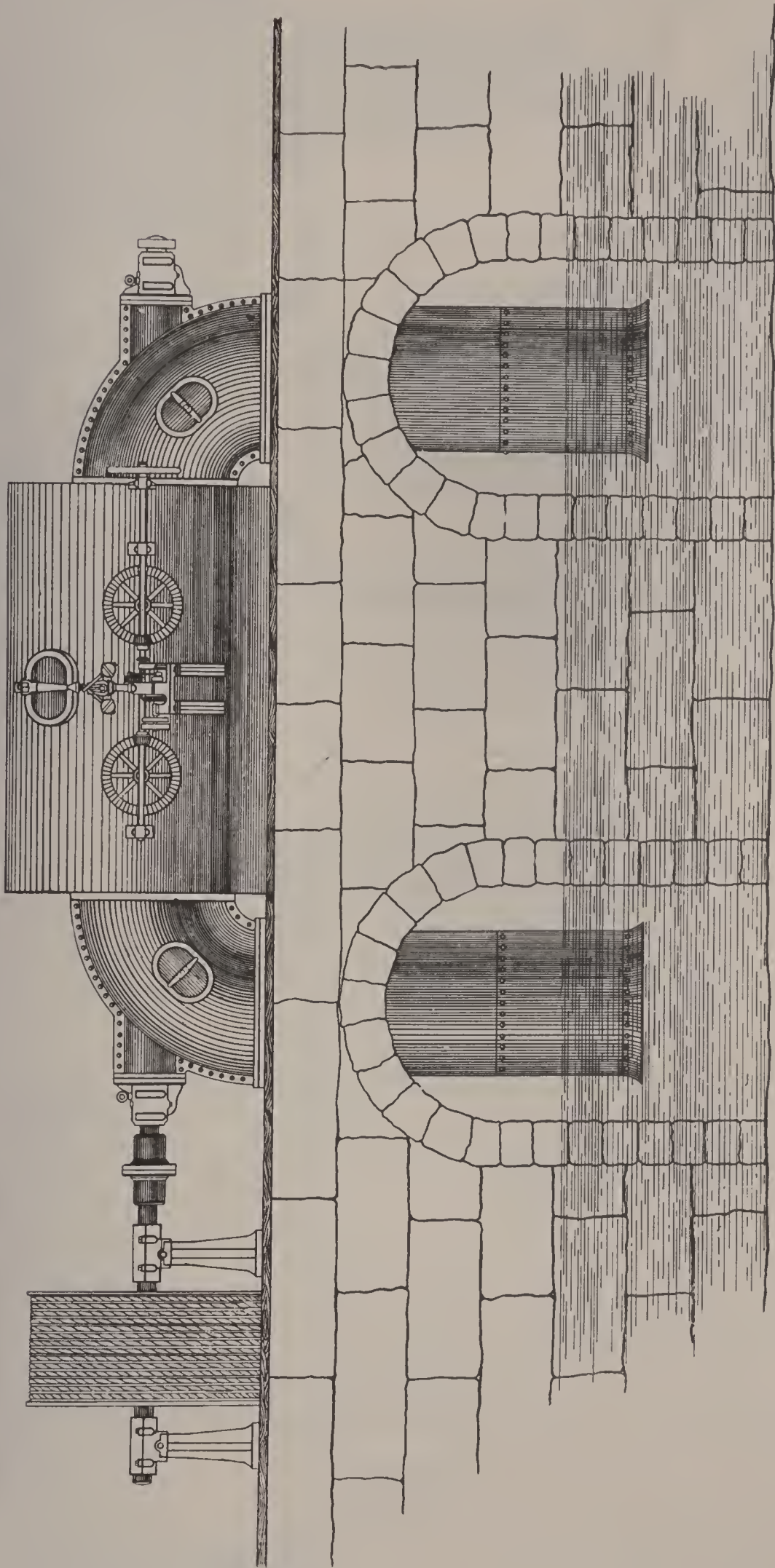


Figure 60.
Pair of Turbines on Horizontal shaft.

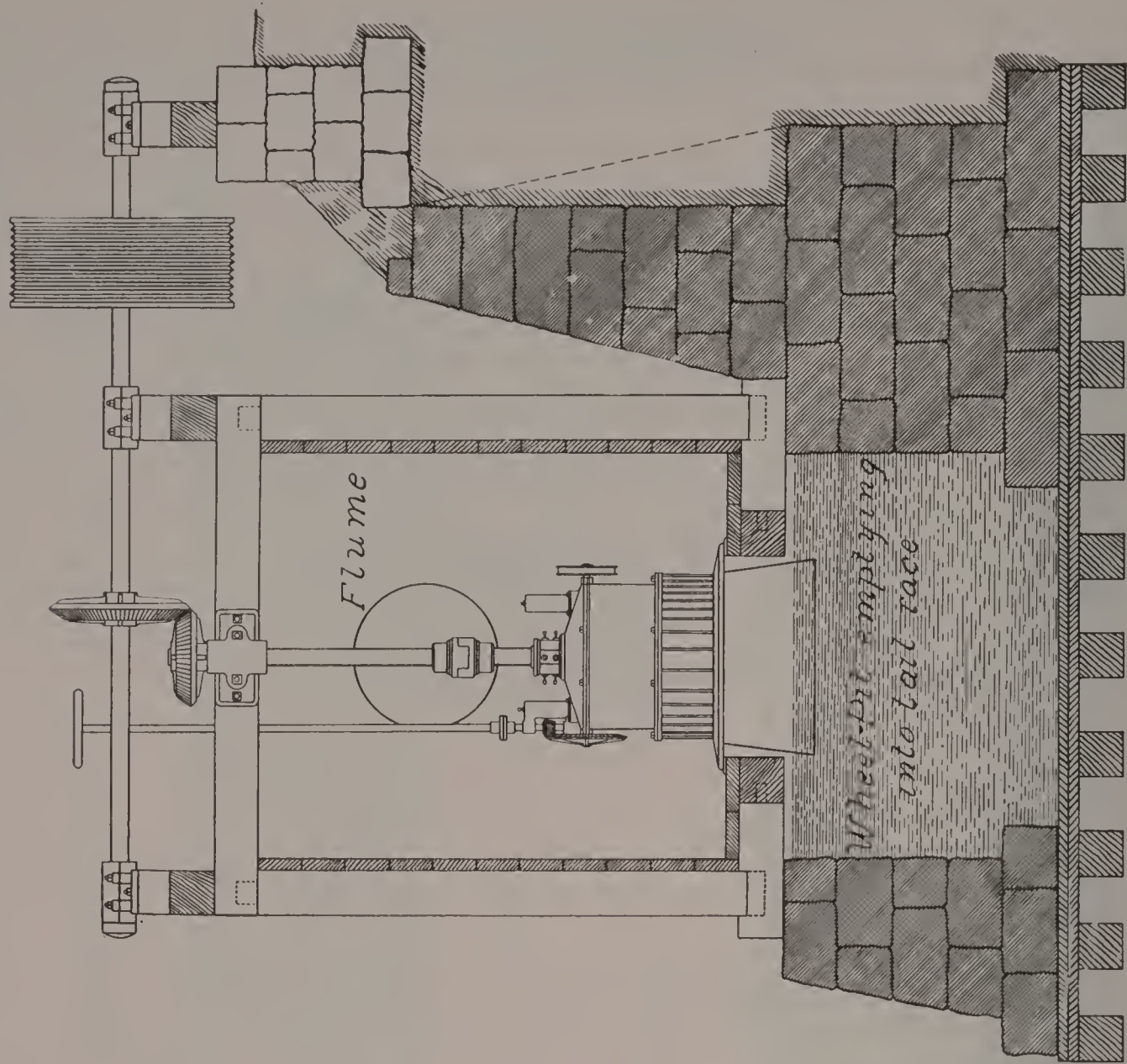


Figure 62.
Sectional View of Vertical Turbine.

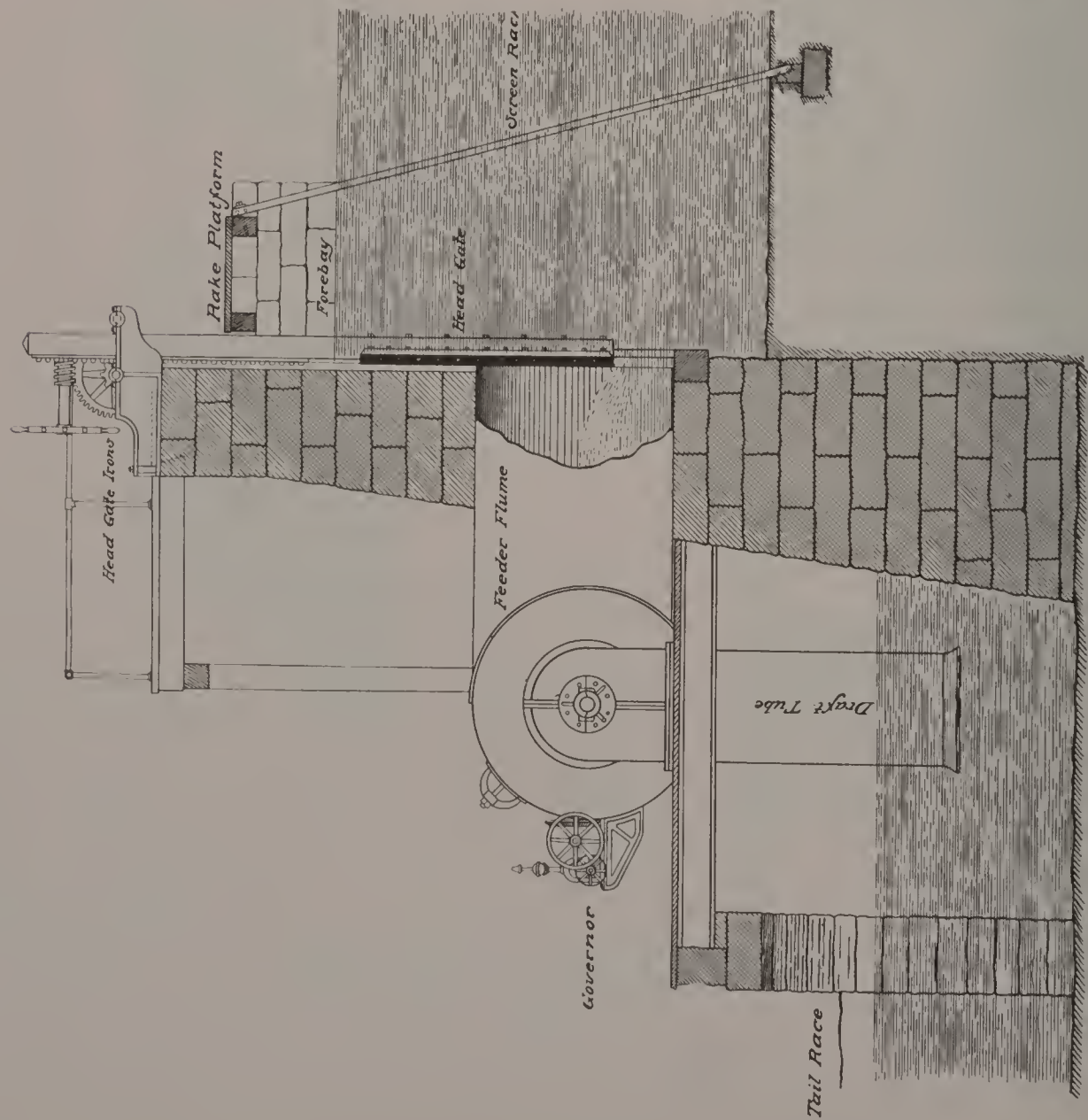


Figure 61.
Sectional view of Horizontal Turbine, Head Race, Flume and Tail Race.

The D. A. Tompkins Company

Charlotte, N. C.

STEAM AND HOT WATER
HEATING

Fire Protection

Tanks

We Carry a Large Stock of Pipe and
Fittings and do all Kinds of Pipe work

HEATING.

We are fully equipped and prepared to take contracts for heating factories, public buildings and private residences.

FACTORY HEATING.

We heat factories by either live steam or exhaust steam.

For factories excellent results may be obtained by live steam in pipes. We will guarantee to utilize exhaust steam for heating and to make it circulate freely through the pipes without putting any back pressure on the engine.

PUBLIC BUILDINGS AND DWELLINGS.

For private houses, we think that a hot water system or a low pressure steam system is best,—the preference being usually for hot water in private houses.

For public buildings we think that low pressure steam or hot water should be used,—the preference being for low pressure steam and especially so in large buildings.



SHOWING HOUSE HEATED WITH HOT WATER.

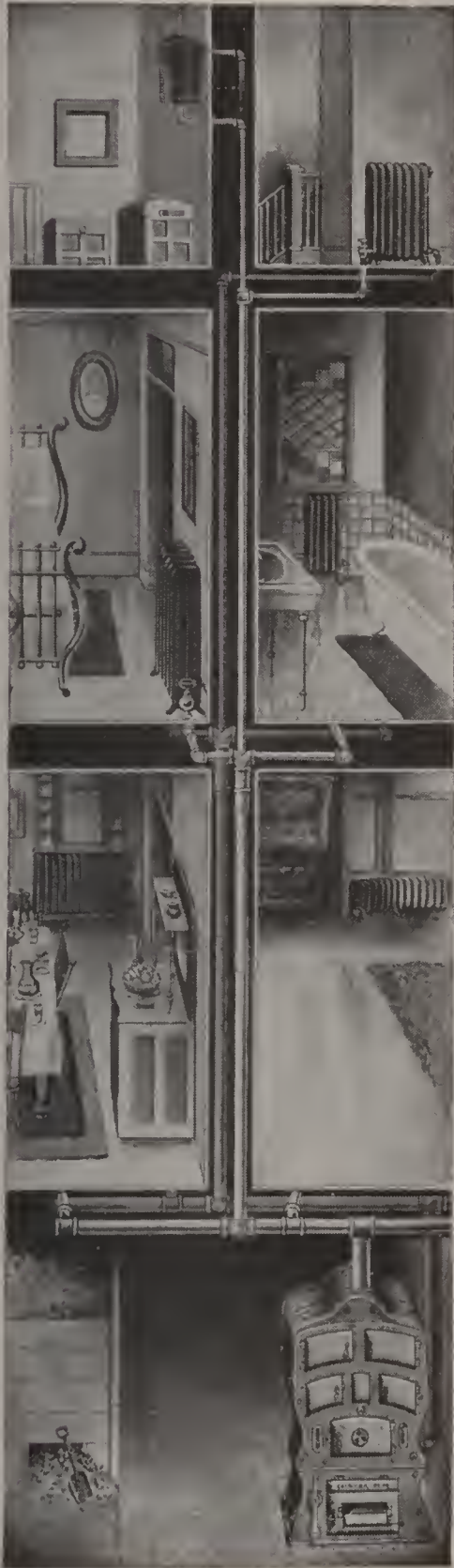


Figure 63.
Concealed Work.



Figure 64.
Exposed Work.

STEAM BOILERS.
FOR HARD OR SOFT COAL OR WOOD.

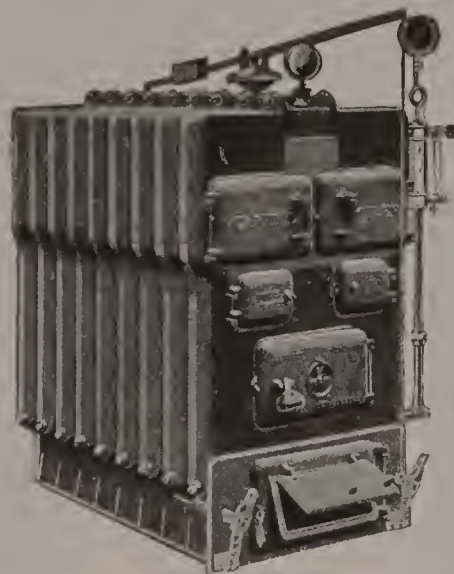


Figure 65.

TABLE OF DIMENSIONS AND CAPACITIES:

No.	Capacity Direct Radiation.	Price.	Size of Grate.	Depth, Inches.	Shipping Weights.	No.	Capacity Direct Radiation.	Price.	Size of Grate.	Depth, Inches.	Shipping Weights.
418	350	\$221.00	18x18	26	1460	838	2850	\$1112.00	38x48	70	8450
518	475	276.00	18x24	32	1740	938	3300	1225.00	38x56	78	9350
618	600	338.00	18x36	38	2040	1038	3800	1350.00	38x64	86	10250
718	725	397.00	18x36	44	2330	1138	4300	1475.00	38x72	94	11150
818	850	444.00	18x42	50	2740	1238	4800	1600.00	38x80	102	12050
626	1000	500.00	26x30	38	3140	1338	5300	1725.00	38x88	110	12950
726	1200	575.00	26x36	44	3520	850	4100	1425.00	50x48	70	10100
826	1400	650.00	26x42	50	4000	950	4700	1575.00	50x56	78	11100
926	1600	725.00	26x48	56	4420	1050	5400	1750.00	50x64	86	12100
1026	1800	800.00	26x48	62	4850	1150	6000	1900.00	50x72	94	13050
1126	2000	875.00	26x54	68	5330	1250	6700	2075.00	50x80	102	14050
1226	2250	962.00	26x54	74	5730	1350	7300	2225.00	50x88	110	15250
1326	2500	1025.00	26x60	80	6130	1450	8000	2400.00	50x96	118	16350
1426	2750	1087.00	26x60	86	6530						

Total height of boilers Nos. 418 to 818 inclusive, 56 inches.
Total height of boilers Nos. 626 to 1426 inclusive, 60 inches.
Total width of boilers Nos. 418 to 818 inclusive, 28 inches.
Total width of boilers Nos. 626 to 1426 inclusive, 38 inches.
Height of water line Nos. 418 to 818 inclusive, 46 inches.
Height of water line Nos. 626 to 1426 inclusive, 50 inches.
Size smoke pipe collar, Nos. 418 to 818 inclusive, 9x10 inches.
Size smoke pipe collar, Nos. 626 to 1426 inclusive, 10x12 inches.
Total height of boilers Nos. 838 to 1338 inclusive, 72 inches.
Total height of boilers Nos. 850 to 1450 inclusive, 76 inches.
Total width of boilers Nos. 838 to 1338 inclusive, 58 inches.
Total width of boilers Nos. 850 to 1450 inclusive, 70 inches.
Height of water line, Nos. 838 to 1338 inclusive, 63 inches.
Height of water line, Nos. 850 to 1450 inclusive, 67 inches.
Boilers Nos. 838 to 1450 inclusive, tapped for 2-4 inch and 2-6 inch outlets and 4-4 inch inlets.
Lists show maximum length of grate. Under suitable draft conditions we do not recommend depth to exceed 64 inches. Bridge wall sections can be supplied to make grates required length on any fire pots with depth exceeding 56 inches.

HOT WATER BOILERS.
FOR HARD OR SOFT COAL OR WOOD.



Figure 66.

TABLE OF DIMENSIONS AND CAPACITIES.

No	Capacity Direct Radiation.	Price.	Size of Grate.	Depths, Inches.	Shipping Weights.
418	575	\$209	18 x 18	26	1460
518	775	262	18 x 24	32	1740
618	1000	325	18 x 30	38	2040
718	1200	384	18 x 36	44	2330
818	1400	431	18 x 42	50	2740
626	1650	487	26 x 30	38	3140
726	2000	562	26 x 36	44	3520
826	2325	638	26 x 42	50	4000
926	2650	712	26 x 48	56	4420
1026	2975	788	26 x 48	62	4850
1126	3300	850	26 x 54	68	5330
1226	3725	939	26 x 54	74	5730
1326	4125	1000	26 x 60	80	6130
1426	4550	1062	26 x 60	86	6530
838	4700	1087	38 x 48	70	7600
938	5450	1200	38 x 56	78	8400
1038	6275	1330	38 x 64	86	9200
1138	7100	1450	38 x 72	94	10000
1238	7925	1575	38 x 80	102	10800
1338	8750	1700	38 x 88	110	11600
850	6775	1400	50 x 48	70	8850
950	7750	1550	50 x 56	78	10000
1050	8900	1725	50 x 64	86	11000
1150	9900	1875	50 x 72	94	11900
1250	11050	2050	50 x 80	102	12800
1350	12050	2200	50 x 88	110	13700
1450	13200	2375	50 x 96	118	14600

Total height boilers Nos. 418 to 818 inclusive, 56 inches.

Total height boilers Nos. 626 to 1426 inclusive, 60 inches.

Total width boilers Nos. 418 to 818 inclusive, 28 inches.

Total width boilers Nos. 626 to 1426 inclusive, 38 inches.

Extra tappings can be supplied if desired.

Size smoke pipe collar Nos. 418 to 818 inclusive, 9x10 inches.

Size smoke pipe collar Nos. 626 to 1426 inclusive, 10x12 inches.

Total height of boilers Nos. 838 to 1338 inclusive, 65 inches.

Total height of boilers Nos. 850 to 1450 inclusive, 68 inches.

Total width of boilers Nos. 838 to 1338 inclusive, 58 inches.

Total width of boilers Nos. 850 to 1450 inclusive, 70 inches.

Boiler No. 838 tapped for 4-4 inch flows, returns duplicate.

Boilers Nos. 938 to 1450 inclusive, tapped for 2-4 inch and 2-6 inch flows, re-
turns duplicate.

Lists show maximum length of grate. Under suitable draft conditions we
do not recommend a depth to exceed 64 inches. Bridge wall sections can be sup-
plied to make grates required length on any fire pots with depth exceeding 56
inches.

LIST OF SIZES.

HEATING SURFACE—SQUARE FEET							
No. of Sections	Length 2½-in. per Sec.	45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3½ sq. ft. per Sec.	26-in. Height. 2½ sq. ft. per Sec.	23-in. Height. 2½ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20
11	27½	55	44	36⅔	29⅓	25⅔	22
12	30	60	48	40	32	28	24
13	32½	65	52	43⅓	34⅔	30⅓	26
14	35	70	56	46⅔	37⅓	32⅔	28
15	37½	75	60	50	40	35	30
16	40	80	64	53⅓	42⅔	37⅓	32
17	42½	85	68	56⅔	45⅓	39⅔	34
18	45	90	72	60	48	42	36
19	47½	95	76	63⅓	50⅔	44⅓	38
20	50	100	80	66⅔	53⅓	46⅔	40
21	52½	105	84	70	56	49	42
22	55	110	88	73⅔	58⅔	51⅓	44
23	57½	115	92	76⅔	61⅓	53⅔	46
24	60	120	96	80	64	56	48
25	62½	125	100	83⅓	66⅔	58⅓	50
26	65	130	104	86⅔	69⅓	60⅔	52
27	67½	135	108	90	72	63	54
28	70	140	112	93⅓	74⅔	65⅓	56
29	72½	145	116	96⅔	77⅓	67⅔	58
30	75	150	120	100	80	70	60
31	77½	155	124	103⅓	82⅔	72⅓	62
32	80	160	128	106⅔	85⅓	74⅔	64



Figure 67.

We also furnish three and four column radiators.

RADIATORS (Continued).

INDIRECT RADIATORS.

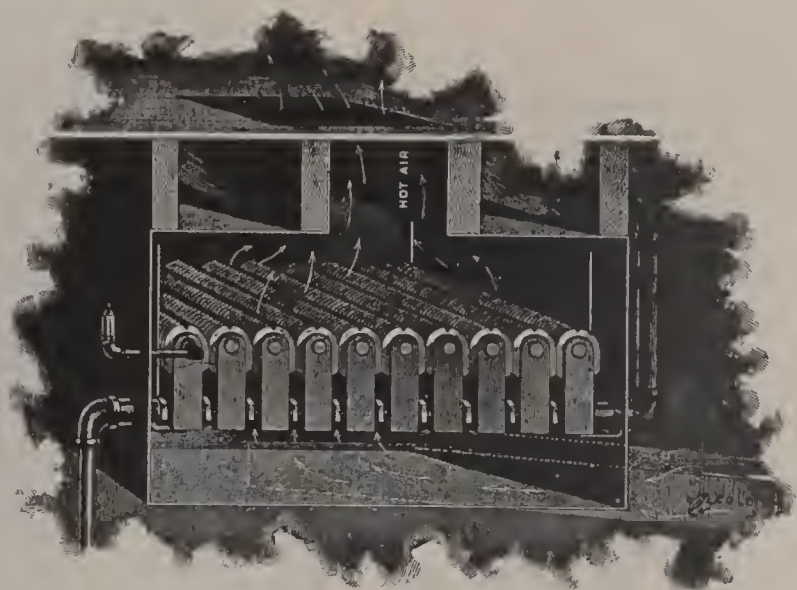


Figure 68.

This illustration shows method of introducing hot air into a room through a register in floor.

DATA FOR INDIRECT STEAM RADIATORS.

Heat- ing Surface.	Cold Air Supply.	Diameter of Duct if Round.	Hot Air Flue.	Size for Brick Work if Hot Air Flues.	Size of Register.	Ratio of 1 to 30.	Ratio of 1 to 35.	Ratio of 1 to 40.
Sq. ft.	Sq. in.	Inches.	Sq. in.	Inches.	Inches.	Cu. ft.	Cu. ft.	Cu. ft.
24	36	6.8	48	4 x 12	8 x 8	720	840	960
36	54	8.3	72	8 x 12	9 x 12	1080	1260	1440
48	72	9.6	96	8 x 12	10 x 14	1440	1680	1920
60	90	10.0	120	12 x 12	12 x 15	1800	2100	2400
72	108	11.7	144	12 x 12	12 x 19	2160	2520	2880
84	126	12.7	168	12 x 16	14 x 22	2520	2940	3360
96	144	13.5	192	12 x 16	14 x 24	2880	3360	3840
108	162	14.4	226	12 x 20	16 x 20	3240	3780	4320
120	180	15.2	240	12 x 20	16 x 24	3600	4200	4800
132	198	15.9	264	12 x 24	20 x 20	3960	4620	5280
144	216	16.6	288	12 x 24	20 x 24	4320	5040	5760

Each Section contains 12 square feet of heating surface in both Steam and Hot Water.

RADIATORS (Continued).

DIRECT-INDIRECT RADIATORS.

Outside measurements of flange or lip around back air-inlet of Box Base, for attaching sheet-iron sleeve or pipe, are:

Base.	Inches.
12-section	$24\frac{1}{4} \times 3\frac{1}{4}$
11-section	$21\frac{1}{4} \times 3\frac{1}{4}$
10-section	$18\frac{1}{4} \times 3\frac{1}{4}$
9-section	$15\frac{1}{4} \times 3\frac{1}{4}$
8-section	$14\frac{1}{4} \times 3\frac{1}{4}$
7-section	$11\frac{7}{8} \times 3\frac{1}{4}$
6-section	$9 \times 3\frac{1}{4}$
5-section	$6 \times 3\frac{1}{4}$
4-section	$5\frac{5}{8} \times 3\frac{1}{4}$
3-section	$2\frac{3}{4} \times 3\frac{1}{4}$

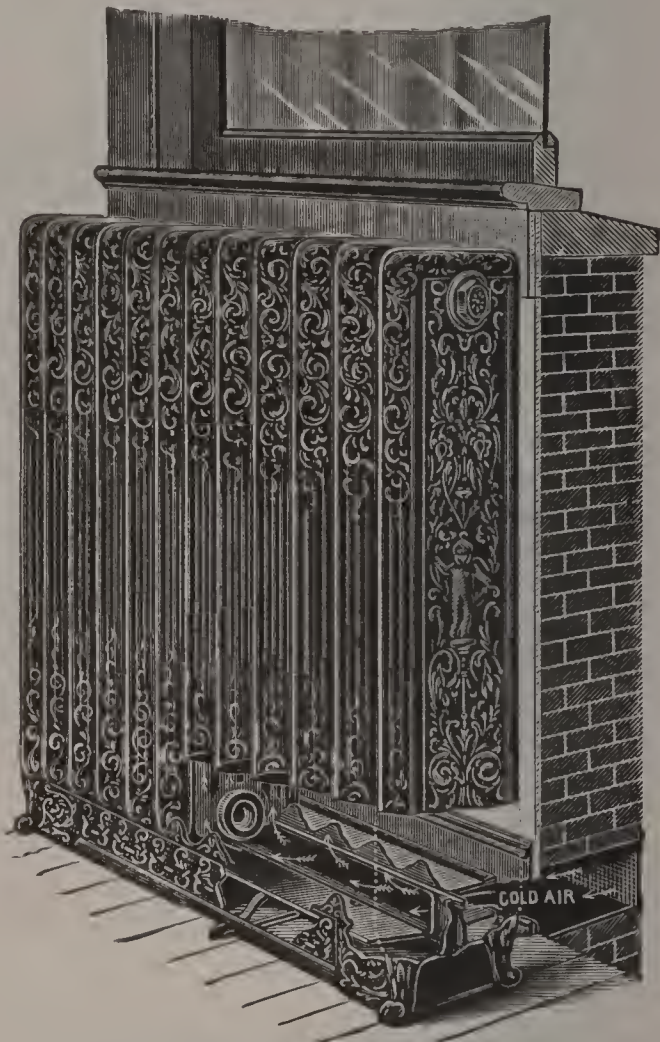


Figure 69.

Where air conduit is brought up through floor, under radiator, the opening in floor to be covered by dampers in Base should be:

Base.	Inches.	Base.	Inches.
12-section	$24\frac{1}{8} \times 3\frac{7}{8}$	7-section	$11\frac{5}{8} \times 3\frac{7}{8}$
11-section	$21\frac{1}{8} \times 3\frac{7}{8}$	6-section	$8\frac{1}{2} \times 3\frac{7}{8}$
10-section	$18 \times 3\frac{7}{8}$	5-section	$6\frac{1}{8} \times 3\frac{1}{2}$
9-section	$15\frac{1}{8} \times 3\frac{7}{8}$	4-section	$5\frac{1}{2} \times 3\frac{1}{2}$
8-section	$14\frac{3}{8} \times 3\frac{7}{8}$	3-section	$3\frac{1}{4} \times 3\frac{1}{2}$

NOTE.—12-section Box Base is to be used for radiator of twelve sections, or any EVEN number of sections larger. 11-section Box Base for radiator of eleven sections, or any ODD number of sections larger. Bottom of back air-inlet opening is one inch above floor level.

AUTOMATIC HEAT REGULATORS.

FOR CONTROLLING TEMPERATURE
BY OPERATING THE DAMPERS OF
HOT AIR FURNACES, STEAM BOILER AND WATER HEATERS



Adjust here. Its Automatic.
Figure 70.

The wise regulation of temperature in Winter means Home Comfort.

It makes no difference whether you have furnace, steam or hot water apparatus, or whether it is new or old. All you need for securing UNIFORM TEMPERATURE is the

ELECTRIC HEAT REGULATOR.

It automatically controls the drafts. A change of one degree at the thermostat is sufficient to operate the dampers.

This device is as simple and no more expensive than a good clock. It embodies economy, comfort and health. Has proven its merit for 22 years.

If not satisfactory in every way return at our expense. Write today.



STANDARD RADIATOR VALVES.



Figure 71.
With Union.



Figure 72.
Without Union.

PRICE LIST, WOOD WHEEL AND UNION. Fig. 71.

Style.	Size, inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
A	Rough body, finished trim- ings, each.....	\$3.50	\$4.30	\$5.85	\$7.75	\$12.60
B	Rough body, plated trim- mings, each.....	3.75	4.65	6.25	8.00	12.85
C	Rough body, plated all over, each	3.80	4.75	6.40	8.10	13.10
D	Finished all over, each.....	4.00	4.80	6.40	8.75	13.85
E	Finished and plated all over, each	4.25	5.25	7.00	9.25	14.35

PRICE LIST, WOOD WHEEL WITHOUT UNION. Fig. 72.

Style.	Size, inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
A	Rough body, finished trim- mings, each.....	\$2.50	\$3.20	\$4.50	\$6.25	\$10.50
B	Rough body, plated trim- mings, each.....	2.70	3.50	4.75	6.50	10.75
C	Rough body, plated all over, each	2.85	3.65	4.90	6.75	11.00
D	Finished all over each.....	3 00	3.75	5.25	7.25	11.75
E	Finished and plated all over, each	3.10	4.00	5.40	7.75	12.25

STANDARD RADIATOR VALVES.

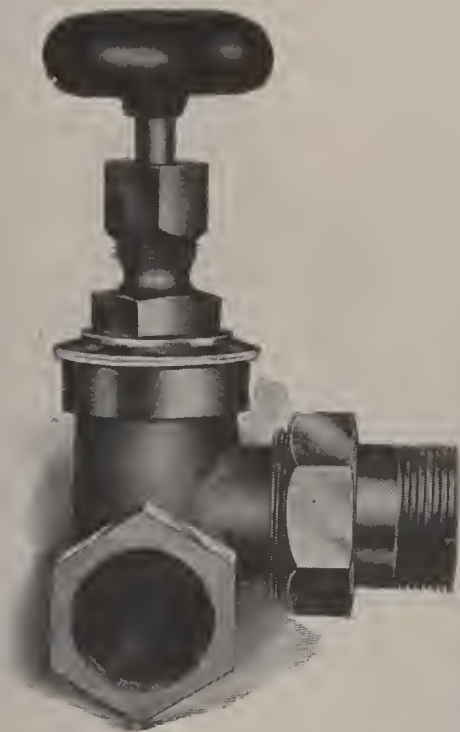


Figure 73.
Right Hand.

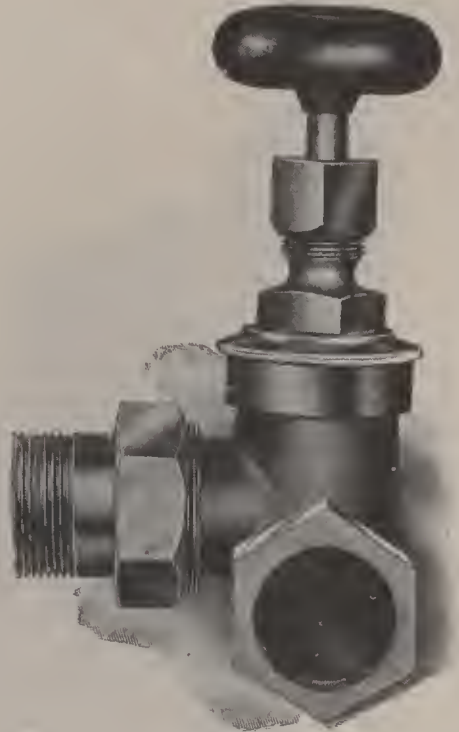


Figure 74.
Left Hand.

Figures 73 and 74 With Union.

PRICE LIST, WOOD WHEEL AND UNION.

Style.	Size, inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
A	Rough body, finished trimmings, each.....	\$3.85	\$4.75	\$6.45	\$8.55	\$13.85
B	Rough body, plated trimmings, each.....	4.15	5.15	6.90	8.80	14.15
C	Rough body, plated all over, each	4.20	5.25	7 05	8.95	14.45
D	Finished all over, each	4.50	5.50	7.20	9.55	15.35
E	Finished and plated all over, each.....	4.85	6.00	7.80	9.95	15.95

STANDARD RADIATOR VALVES.

HOT WATER.



Figure 75.
With Union.



Figure 76.
Without Union.

PRICE LIST, WOOD WHEEL AND UNION. Fig. 75.

Style.	Size, inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
A	Rough body, finished trimmings, each.....	\$2.45	\$3.25	\$4.50	\$6.50	\$10.00
B	Rough body, plated trimmings, each.....	2.60	3.35	4.90	6.65	10.25
C	Rough body, plated all over, each	2.85	3.65	5.05	7.10	10.85
D	Finished all over, each.....	3.00	3.85	5.25	7.50	11.50
E	Finished and plated all over, each	3.40	4.30	5.80	8.10	12.35

PRICE LIST, WOOD WHEEL WITHOUT UNION. Fig. 76.

Style.	Size, inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
A	Rough body, finished trimmings, each.	\$1.60	\$2.25	\$3.25	\$4.50	\$7.00
B	Rough body, plated trimmings, each.....	1.85	2.40	3.60	4.85	7.25
C	Rough body, plated all over, each	1.95	2.65	3.70	5.00	7.75
D	Finished all over, each.....	2.15	2.85	4.00	5.50	8.50
E	Finished and plated all over, each	2.50	3.25	4.45	6.00	9.25

STANDARD RADIATOR VALVES.

UNION ELBOWS.



Figure 77.

PRICE LIST.

Style.	Size, inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
A	Rough body, plain, each.....	\$1.75	\$2.25	\$2.95	\$3.70	\$6.00
B	Rough body, plated trimmings, each.....	1.90	2.40	3.10	3.85	6.15
C	Rough body, plated all over	2.00	2.50	3.20	4.00	7.00
D	Finished all over, each.....	2.20	2.75	3.60	4.60	7.50
E	Finished and plated all over, each.....	2.40	3.00	3.90	4.85	8.50

AUTOMATIC AIR VALVES.

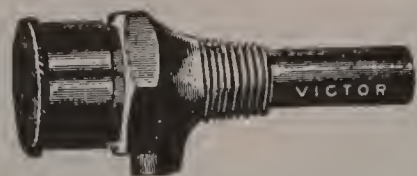


Figure 78.

With Metal Cap.....Price, per dozen, \$7.50.

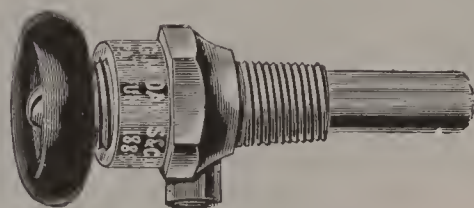


Figure 79.

With Wooden Wheel.



Figure 80.

SECTIONAL.

The plug is of specially prepared composition which extends into the coil but is protected from the steam by a metal casing. As the heat is imparted through the casing to the composition, steam cannot injure the expanding composition.

FACTORY FIRE PROTECTION.

Insurance Equipments for Manufacturing Establishments consist of the following items, which are all governed by certain rules laid down by the Insurance Companies, and are usually subject to special survey and estimate for cost of construction.

FIRST. Automatic Sprinklers and Piping inside all buildings.

SECOND. Special Fire Pumps, either Duplex Steam, or Rotary, Iron Geared attached to water wheel.

THIRD. Outside Fire Hydrants and piping, the number governed by size of risk to be protected.

FOURTH. A Standard Watchman's time detector.

Heretofore the best protection against fire has been put in Textile factories. Lately, however, we have made several important installations in large saw mills, wood-working establishments, cotton seed oil mills and cotton ginneries. It is amazing that insurance rates on standard cotton factories should be 1-5 of one per cent. while cotton ginneries are insured at 6 to 10 per cent. We can construct and equip a cotton ginnery to be as safe as a cotton mill. We especially invite correspondence on the subject of protection against fire.

SPRINKLERS.

Number of Sprinklers allowed on one section of piping.

Size of Pipe.....	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4	5	6
No. Heads Allowed.	1	2	4	8	16	28	48	78	110	150	200

Automatic Sprinklers should be placed not exceeding five feet from sides of building or partitions, and not exceeding ten feet from centre to centre. When building is of mill or bay construction the sprinkler lines must run in each bay. When the ceilings are of a joisted construction, owing to the inability of any sprinkler to properly wet the same, the sprinklers should be brought nearer together.

PIPING.—There should be a riser in each building, and in each section of the building divided by fire walls, of sufficient size to supply all the sprinkler heads on any floor in each section under standard regulations as to size of piping.

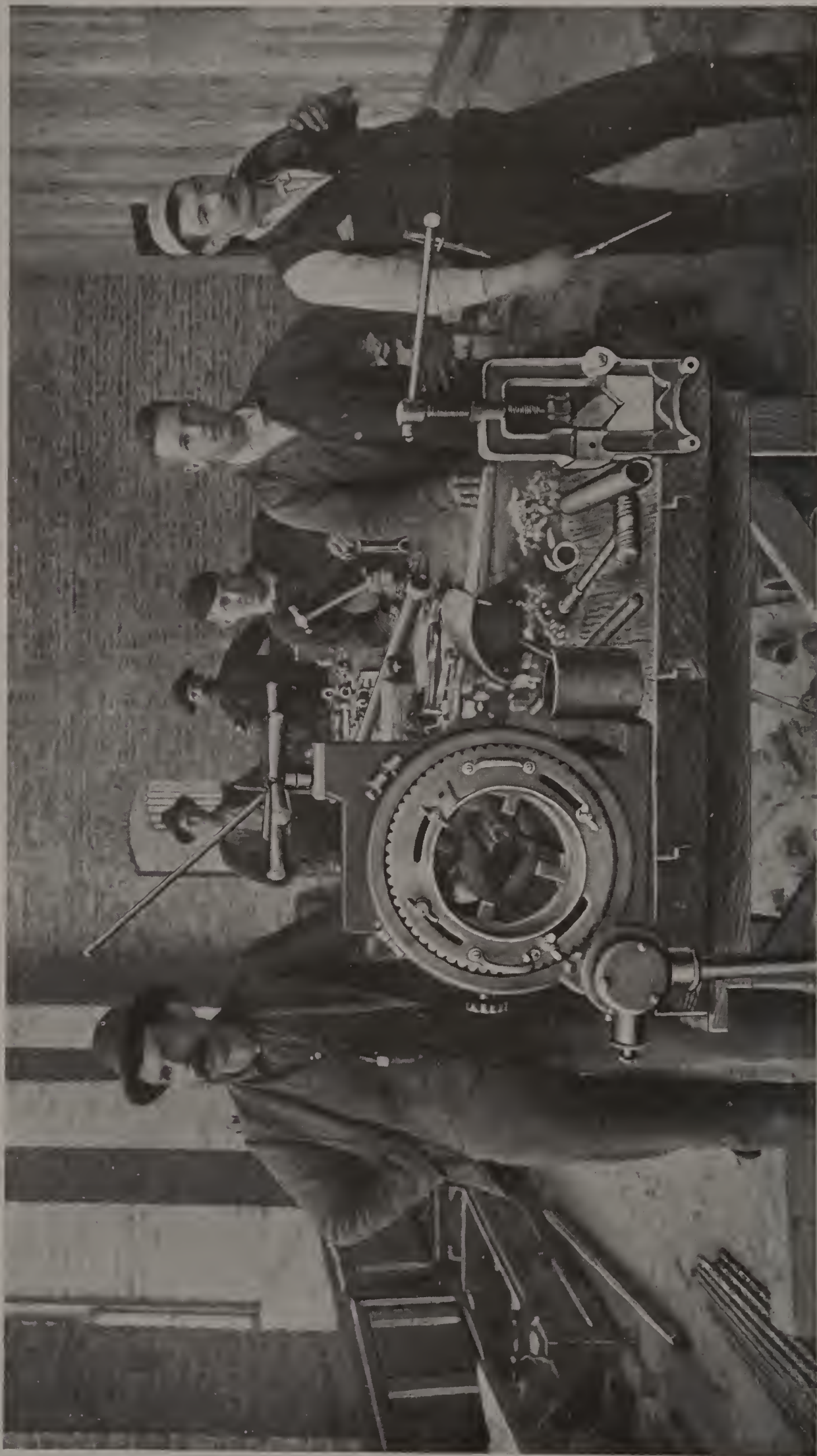


Figure 81.

One of our pipe gangs putting in Fire Protection at Pelzer, S. C. Mill No. 4.

An adequate equipment, consisting of Fire Pump, Water Mains, Hydrants, etc., for an ordinary mill, represents a large outlay of money, all of which may be rendered useless if the hose and implements (which form but a small portion of the whole cost) are kept in towers or buildings where they are liable to be made inaccessible by fire or smoke.

We submit on following pages full illustration and description of Standard Hose House, which provides an accessible place where all such implements may be assembled and kept ready for instant use.

This method avoids delay by having everything at hand, in addition to which the life of the only perishable part of the equipment, viz.:—the fire hose—is prolonged by keeping it as shown, on slatted shelves in well ventilated houses.

EQUIPMENT.

100 feet of hose attached to hydrant and coiled on lower shelf as shown, with standard play pipe attached.

Three lengths (or 150 feet) of extra hose arranged on upper shelf, divided by partitions as shown.

Two axes, two bars, four spanners, two extra pipes, one lantern, all arranged as shown.

Ladder straps and coils of one-half inch hemp rope to suit height of buildings should be hung in each house.

Wrench always on hydrant.

A liberal supply of rubber hose-washers to be provided and hung in a conspicuous place.

Hose to be attached and coiled as shown in Fig. 83. Any other way of coiling will cause last loop or coil to twist short at coupling. If coiled as shown, it will come off the shelf perfectly straight.

Extra hose to be coiled on upper shelf as shown in Fig. 83, with male end of coupling to the front, each length separated from the others by partitions six inches high, so that pulling out of one length will not foul and tangle with others.

For equipment and arranging of same in four-way hydrant house, see Fig. 84.

NOTE.—The National Standard for hydrants now requires that gate valves must be attached to each hydrant outlet as shown in the cut in order to control each hose stream independently.

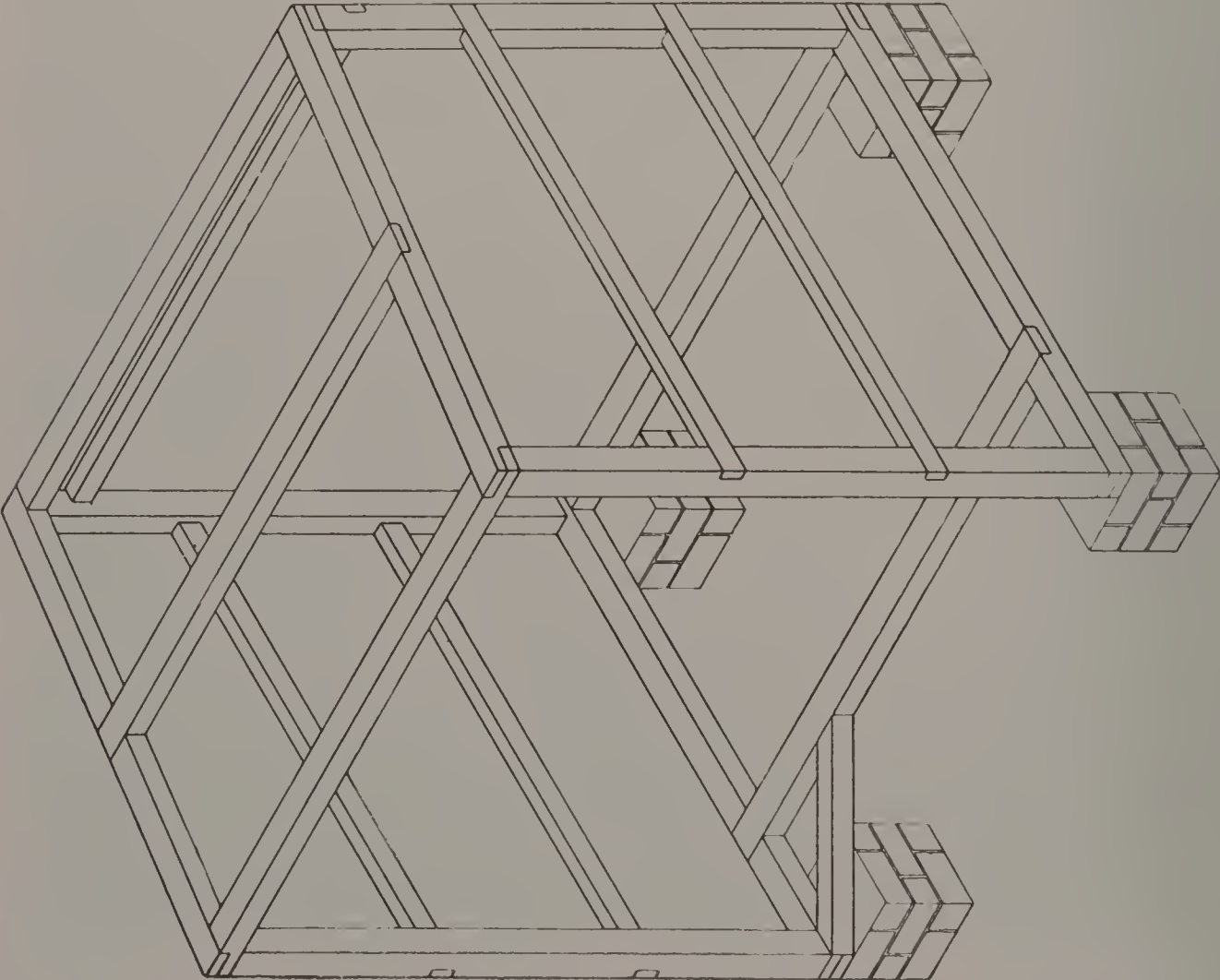


Figure 82.
Foundation and Frame.

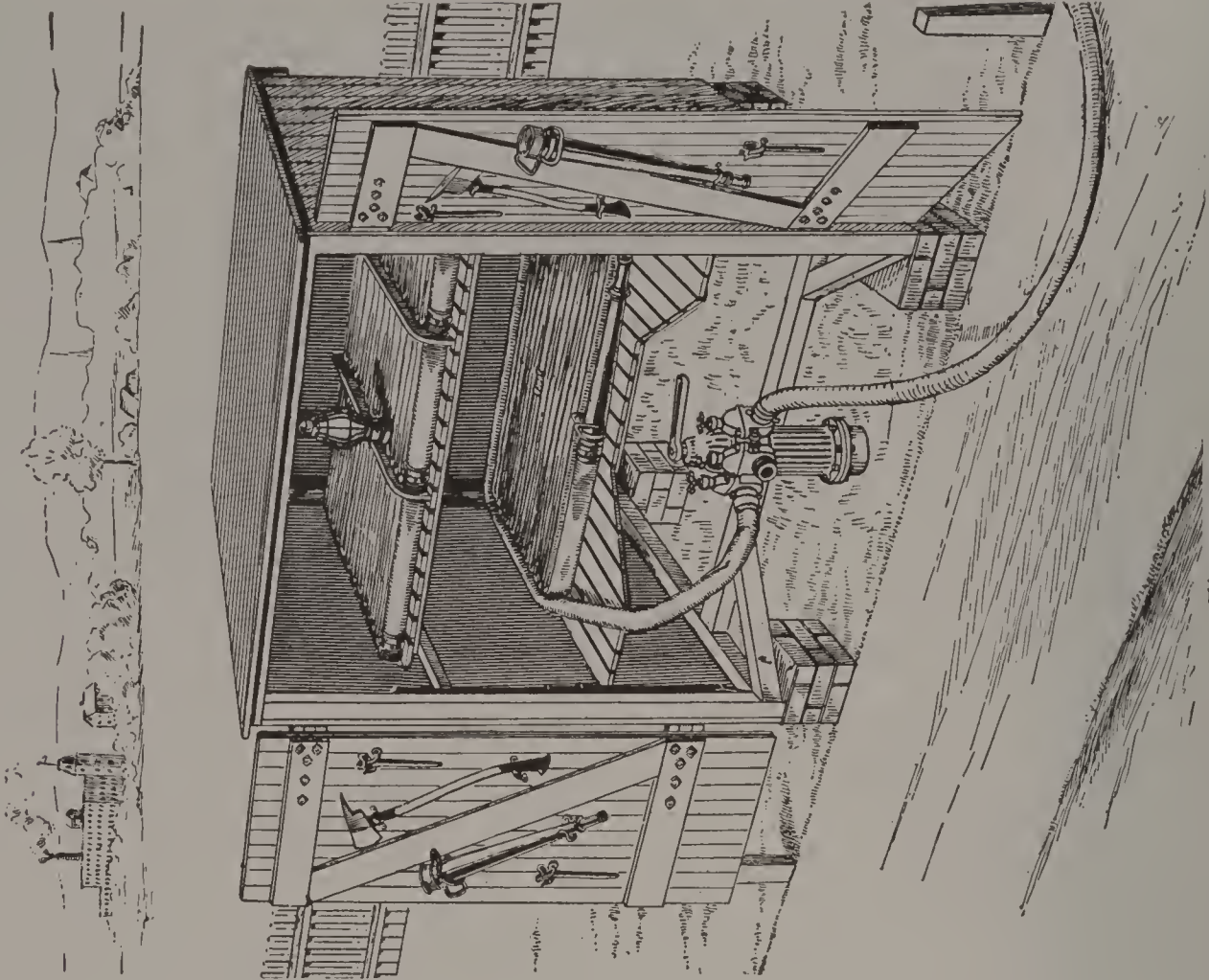


Figure 83.
Interior View of House for Two or Three-way Hydrant,
Fully Equipped.

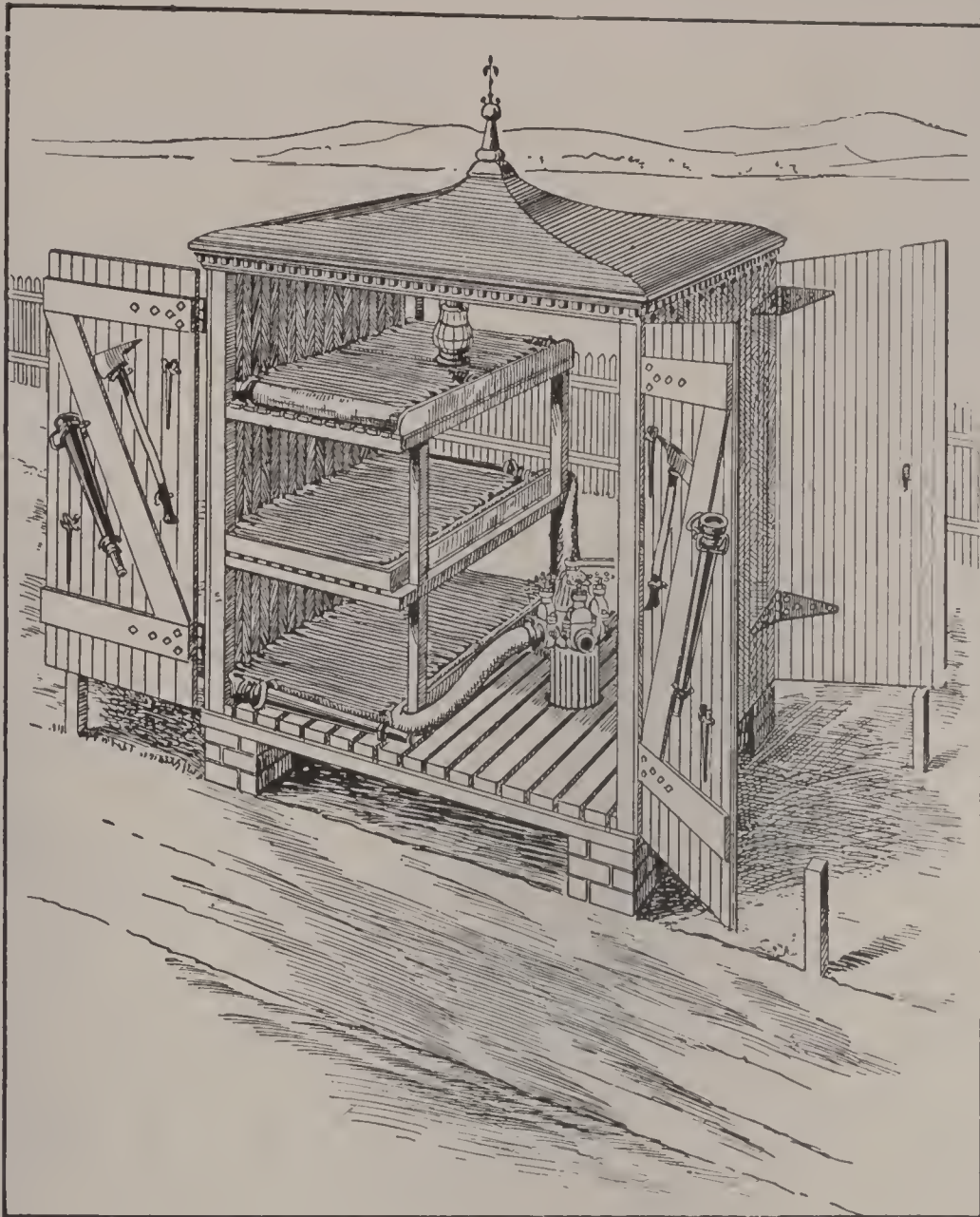


Figure 84.

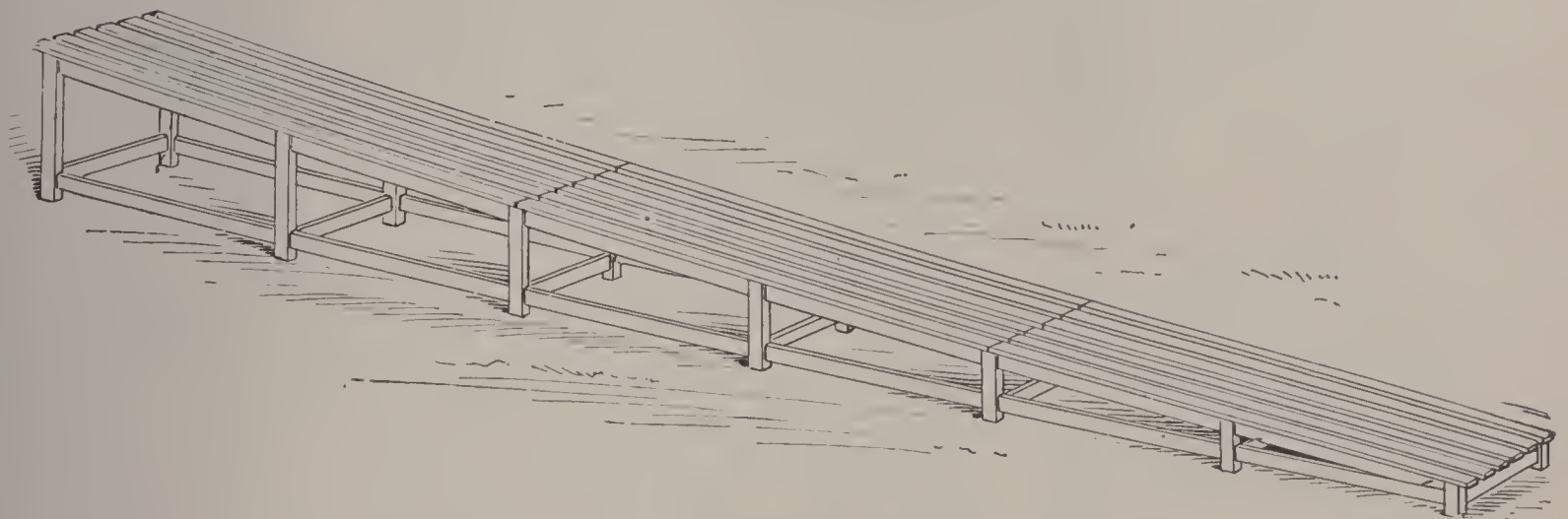


Figure 85.

Fig. 85 represents a rack for drying hose after it has been wet either at a fire or at a test. This rack should be 50 feet long, one foot high at the lower end, 5 feet high at the upper end, and we have shown it 3 to 4 feet wide with a slatted top so that a half dozen lines of hose may be dried at one time.

This is a simple and effective arrangement, and does away with the necessity of hoisting the hose on the outside of the tower as is sometimes done. We consider this one of the essentials in the equipment of a fire protection system, as it will allow the hose to be properly cared for, which will tend to prolong its life and thus reduce the cost of the one perishable part of an equipment.

UNDERWRITERS' FIRE PUMP.

Properly Equipped and Connected.

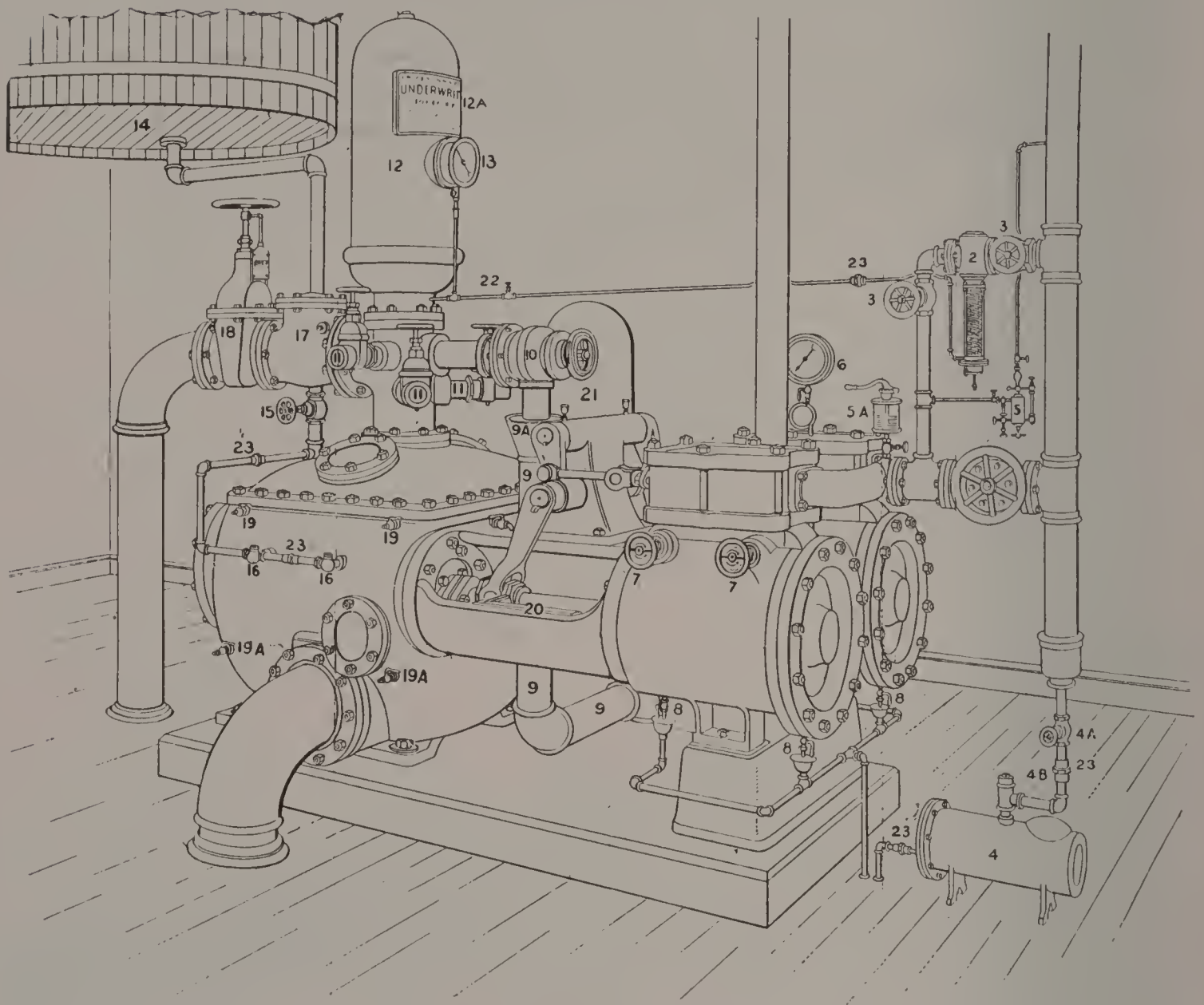


Figure 86.

Underwriter Fire Pump.

Figure 86.

The Underwriter Fire Pump constructed under the specifications of the Associated Factory Mutual Insurance Companies of New England, issued in May, 1895, embodies all the special features of construction that the extensive experience of the insurance companies dictate as essential for a thoroughly reliable Fire Pump, and one that is approved by them for installation under their risks when equipped with special attachments enumerated below.

It is fundamentally a "rust proof" pump. The water plungers, cylinders, linings, stuffing boxes and glands are of special composition. Varying mixtures of copper and tin are employed for plungers and cylinders to prevent scoring. Piston and valve rods are of Tobin bronze and extra heavy. All working parts are of special metal and extra heavy, owing to the high piston travel and increased pressure demanded.

The valve area is extra large, and the water passages are liberal to permit of high speed without shock or jar. The extra attachments and fittings required are as follows: Automatic water pressure relief valve with overflow pipe; steam gauge, as well as water pressure gauge; priming pipes with special valves; vacuum chamber and air chamber of large capacity; approved hose valves of the number specified; large suction and discharge openings for system of hydrants and sprinklers; capacity plate and stroke register; large sight feed lubricator, etc.

Diameter of Steam Cylinders	Diameter of Water Cylinders	Length of Stroke	Nominal Capacity Gallons per Min- ute Full Speed per Underwrit- ers Table.	Exact Underwriters Rating, allowing 10 per cent. for Slip.	No. of Standard 1½ Inches Fire Streams each 250 Gallons per Min- ute.	Size of Pipe for Short Lengths			
						Steam	Exhaust	Suction	Discharge
12	6 7 9 10 12	12	320	359	1	2½	3	6	5
14		12	500	484	2	3	4	8	6
16		12	750	807	3	3½	4	10	7
18		12	1000	1007	4	4	5	12	8
20		16	1500	1507	6	5	6	14	10

HOSE HOUSE EQUIPMENT.

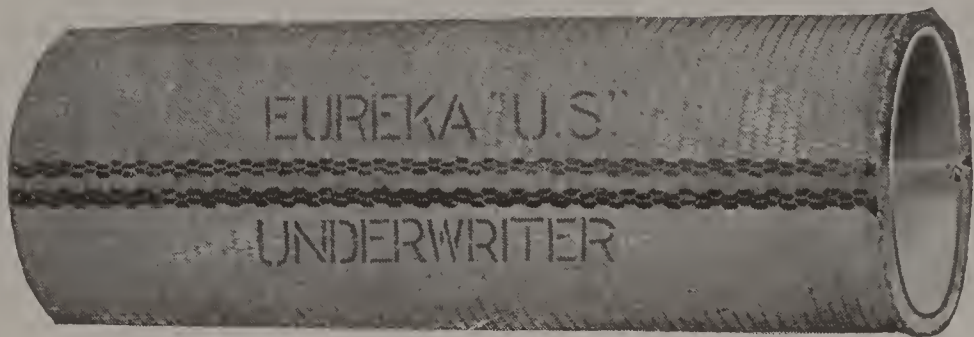


Figure 87.

RED, WHITE, AND BLUE COLOR-LINES.

Stripe consists of four warp-strands of red, and four of blue, separated by four of white, so as to produce a longitudinal stripe of red, white, and blue. Accepted Underwriters' Standard Fire-hose, cotton rubber-lined. Antiseptically treated by the best-known method, approved by Underwriters, for prevention of mildew and rot. The Standard Factory Fire-hose accepted by "The Associated Factory Mutual Fire Insurance Companies," "Factory Insurance Association," and "National Fire Protection Association" for factory-fire protection.

25⁄8-inch internal diameter	per foot, \$0.90
21⁄8-inch internal diameter	per foot, .80
15⁄8-inch internal diameter	per foot, .70

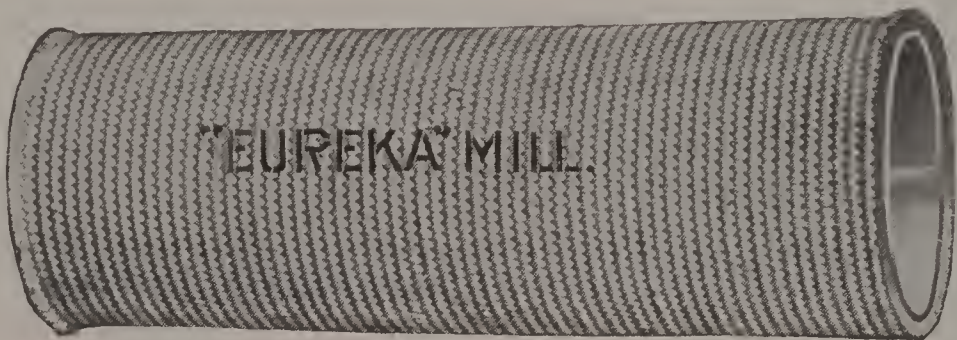


Figure 88.

"EUREKA MILL" HOSE.

Seamless Woven and rubber-lined mildew-proof cotton hose for mill and factory fire purposes. The "Eureka Mill" is a single-ply hose, and intended particularly for mills, warehouses, public institutions, hotels, and all places where hose is kept attached to stand-pipes, fire-pump, etc. It will stand a pressure of 350 pounds per square inch.

1- inch internal diameter	per foot, \$0.35
1¼-inch internal diameter	per foot, .45
1½-inch internal diameter	per foot, .50
2- inch internal diameter	per foot, .60
2¼-inch internal diameter	per foot, .65
2½-inch internal diameter	per foot, .70
3- inch internal diameter	per foot, 1.00
3½-inch internal diameter	per foot, 1.50
4- inch internal diameter	per foot, 2.00

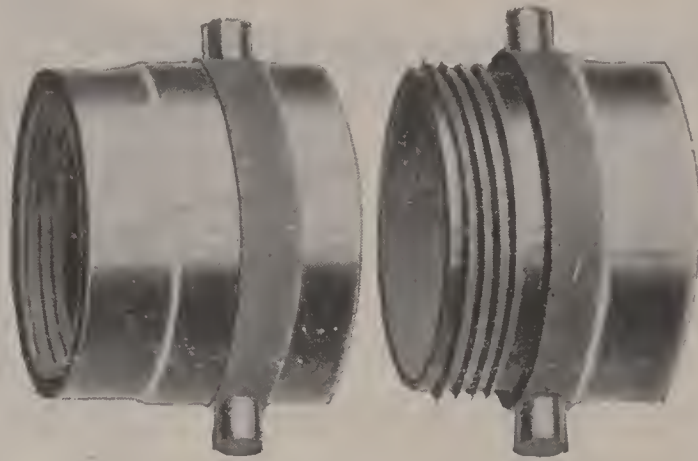


Figure 89.

PATENT EXPANDED RING-COUPPLINGS.

These Couplings, being of expansion-ring pattern, give an unobstructed water-way of the exact size of hose, and when attached can not be blown off.

1¼-inch	per set, \$3.00 each
1½-inch	per set, 3.00 each
2 -inch	per set, 3.50 each
2½-inch	per set, 4.00 each



Figure 90.

KEROSENE LANTERN.

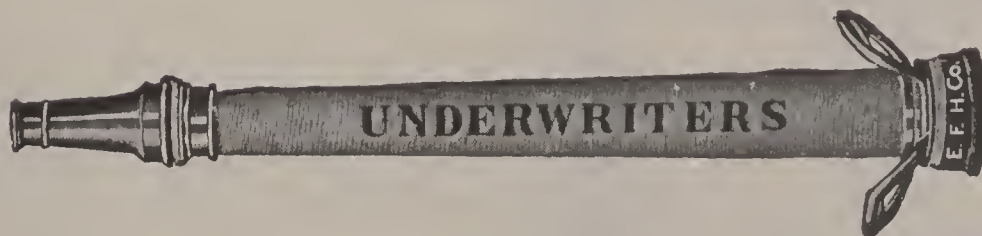


Figure 91.

STANDARD UNDERWRITERS PLAY-PIPES.

These Play-Pipes are thirty inches long, are wound with cord and painted red, with metal swivel-handles and screw tips, any size outlet desired.

Price	each, \$10.00
-----------------	---------------

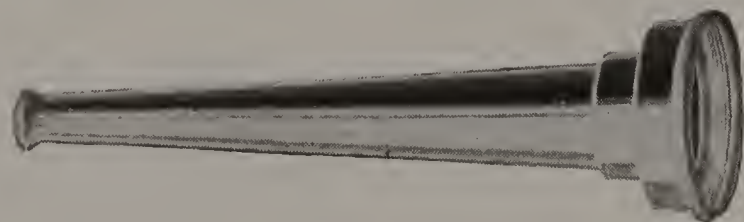


Figure 92.

PLAIN, SHORT, CAST HOSE-PIPES.

Size	3/4	1	1 1/4	1 1/2	2	2 1/2	2 3/4
Length, inches, ...	8	9	10	10 1/2	11	12	15
Per dozen	\$7.00	\$9.00	\$15.00	\$18.00	\$30.00	\$48.00	\$65.00

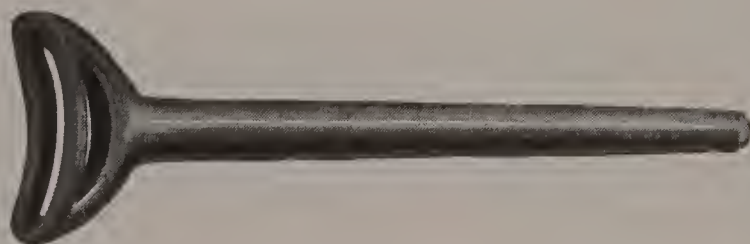


Figure 93.

SPANNER.

Will turn coupling right or left.

Malleable iron, galvanized	per dozen, \$6.00
--------------------------------------	-------------------

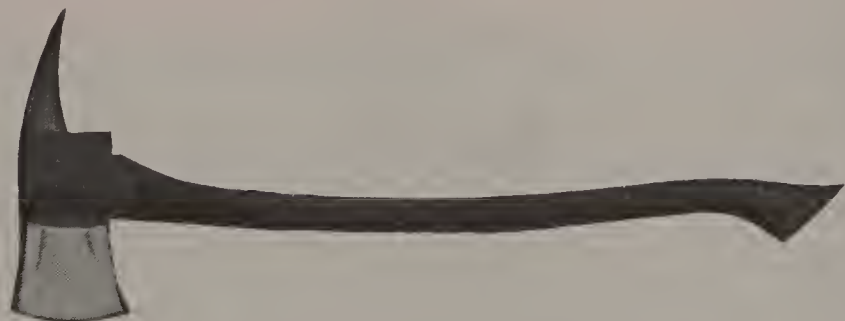


Figure 94.

FIRE-AXE, WITH PICK BACK.

Best quality, 8-pound	per dozen, \$30.00
Best quality, 6-pound	per dozen, 24.00
Best quality, 8-pound with plain head	per dozen, 24.00
Best quality, 6-pound with plain head	per dozen, 20.00

STEEL CROWBARS

Regulation size, painted	\$3.00
Regulation size, polished	4.00
Regulation size, polished and plated	5.00

CROWBAR-HOLDERS

For side-walls, japanned	per set, \$2.50
For side-walls, polished brass	per set, 3.50
For side-walls, nickeled	per set, 4.00

AXE-HOLDERS

For side-walls, japanned	per set, \$1.00
For side-walls, polished brass	per set, 2.50

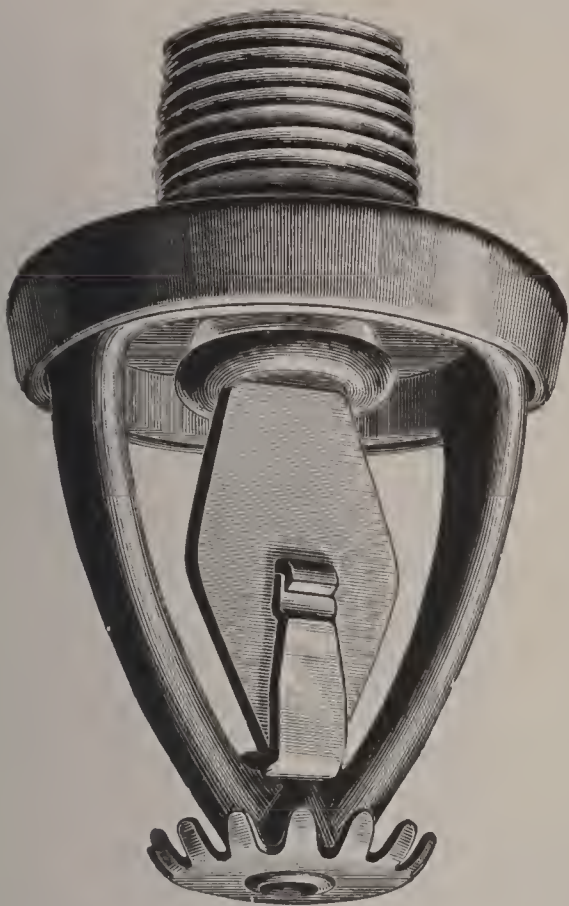


Figure 95.

AUTOMATIC

SPRINKLERS

FOR

FACTORY

FIRE

PROTECTION.

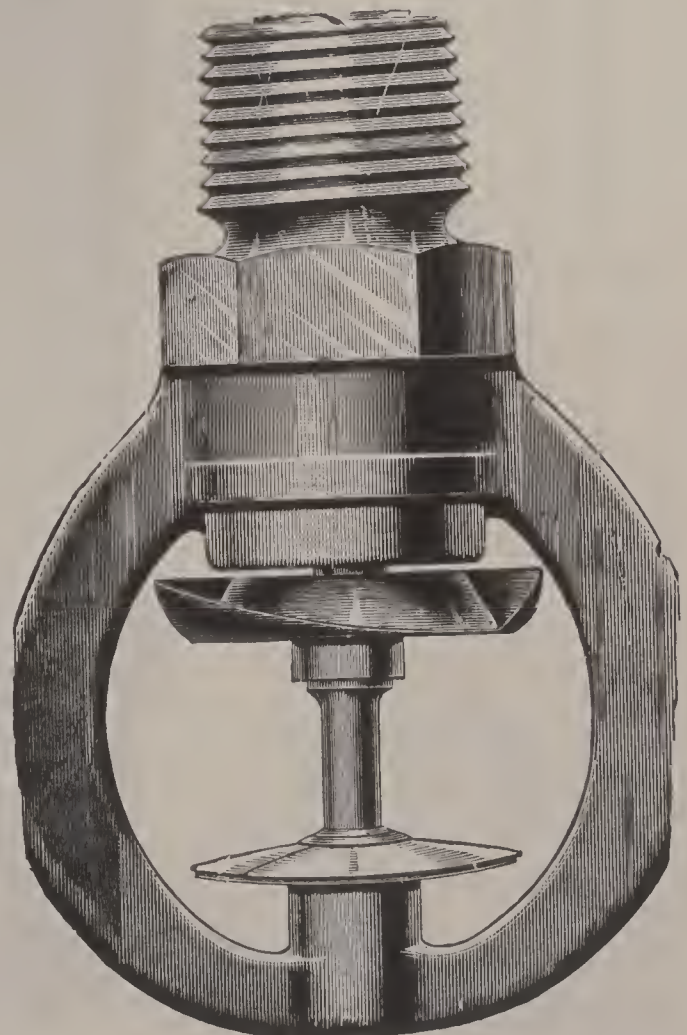


Figure 96.

Prices quoted on application.

STANDARD COMPRESSION FIRE HYDRANT.

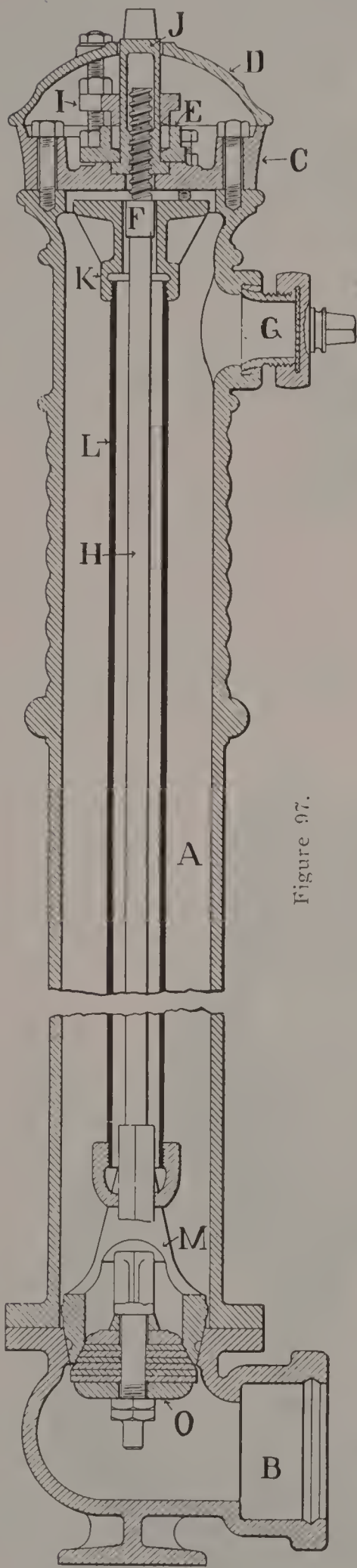


Figure 97.



Figure 98.

COMPRESSION FIRE HYDRANT.

Dimensions and Price List.

With or Without Frost Case.

Figs. 97 and 98.

Diameter of Pipe Connection	Diameter of Stand Pipe	Valve Opening	Number and Size of Nozzles	Length from Pavement to Bottom of Connection, 5 ft.	Add or Deduct for each 6 ins. difference in length from 5 ft.	Each 2½-inch Nozzle Additional	Each Steamer Nozzle Additional	Frost Case Additional	Add for Secondary Stop Valve
3 or 4 ins.	5 ins.	3 ins.	One 2½-inch	List \$28.00	List \$1.00	List \$2.00	List \$3.50	List \$4.50	List \$5.75
4 or 6 "	6 "	4 "	Two 2½-inch	33.00	1.00	2.00	3.50	5.00	7.50
4 or 6 "	6 "	4 "	One Steamer or two 2½-in.	33.00	1.00	2.00	3.50	5.00	7.50
4 or 6 "	7 "	5 "	One Steamer or two 2½-in.	36.00	1.25	2.00	3.50	6.00	9.00
4 or 6 "	7 "	5 "	One Steamer and one 2½-in.	38.00	1.25	2.00	3.50	6.00	9.00
6 "	9 "	6 "	One Steamer and two 2½-in.	51.35	1.75	2.00	3.50	9.00	11.00

INDICATOR POSTS.



Figure 99.



Figure 100.

When ordering kindly send us full dimensions or, what is much more preferable, a valve.

Always state number of turns to open Valve and whether valve opens by turning to the LEFT OR RIGHT.

List Price, \$36.00. Write for Discounts.

SPECIAL FIRE OR INDICATOR VALVES.

COMPOSITION.

Diameter of opening inches.....	1½	2	2½	3	3½	4
Screw ends....	\$9.25	13.75	20.25	27.25	41.00	51.75
Flange ends.....	11.25	17.75	24.25	32.25	49.00	59.75

IRON BODY. COMPOSITION MOUNTED. FIG. 101.

Diameter of opening inches.....	2	2½	3	3½	4	4½	5	6	7	8	10	12
Screw ends.....	\$13.75	16.50	20.25	24.00	26.75	30.00	32.50	39.00	53.50	65.00	85.00	113.00
Flange ends.....	13.75	17.00	20.75	25.00	27.25	31.00	34.50	41.00	53.50	65.00	85.00	113.00

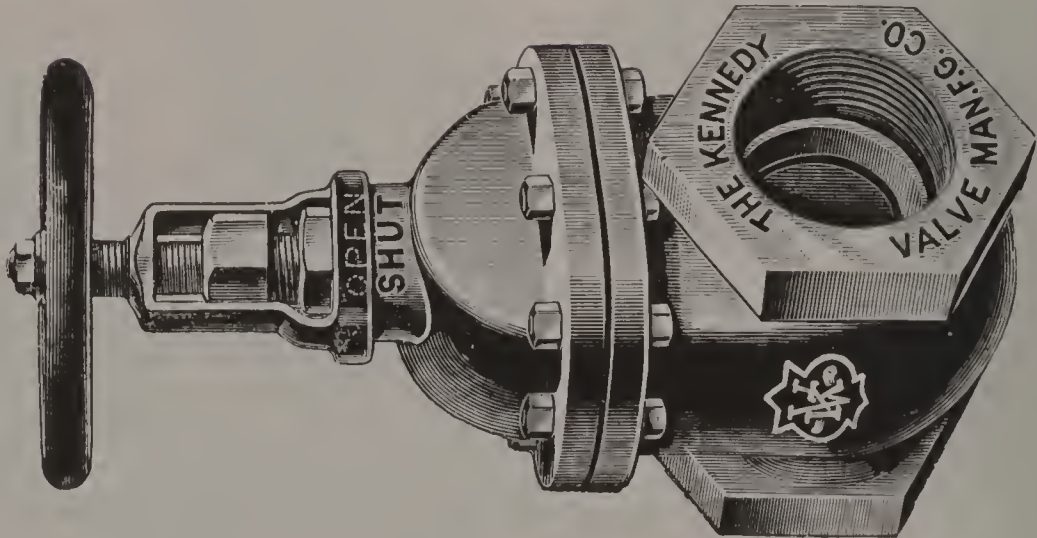


Figure 101.

Prices of larger sizes given on application.

FIRE DOOR FIXTURES.

SLIDING FIRE DOOR.

Closing Automatically by Heat.

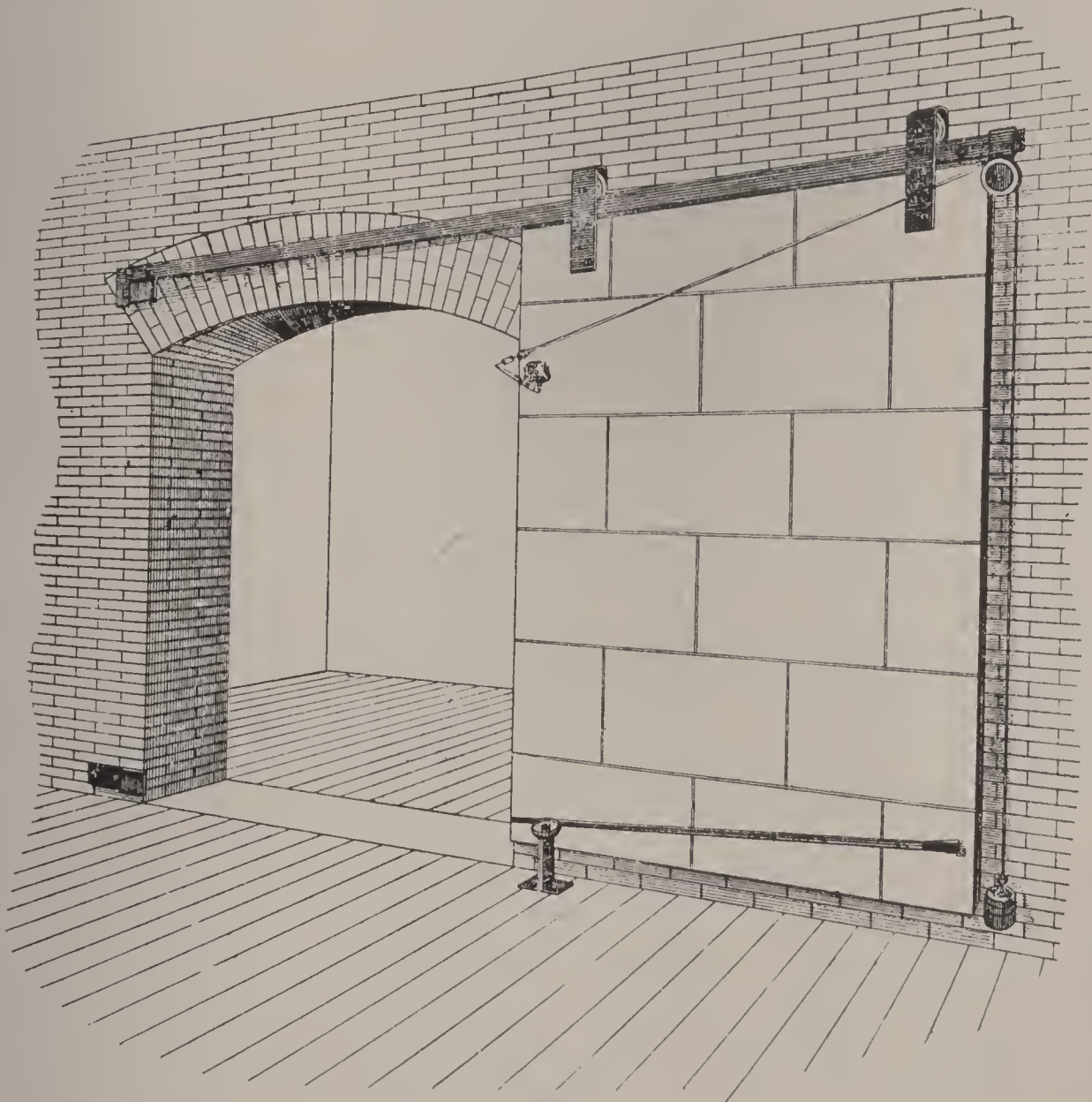


Figure 102.

The above cut of open door shows releasing device exposed to either side of opening. Wood ignites at 700° ; this link fuses at 160° , releasing the balance weight, when door runs down inclined track by gravity, and is firmly wedged over the opening.

Prices on application.

TANKS AND TANK TOWERS.

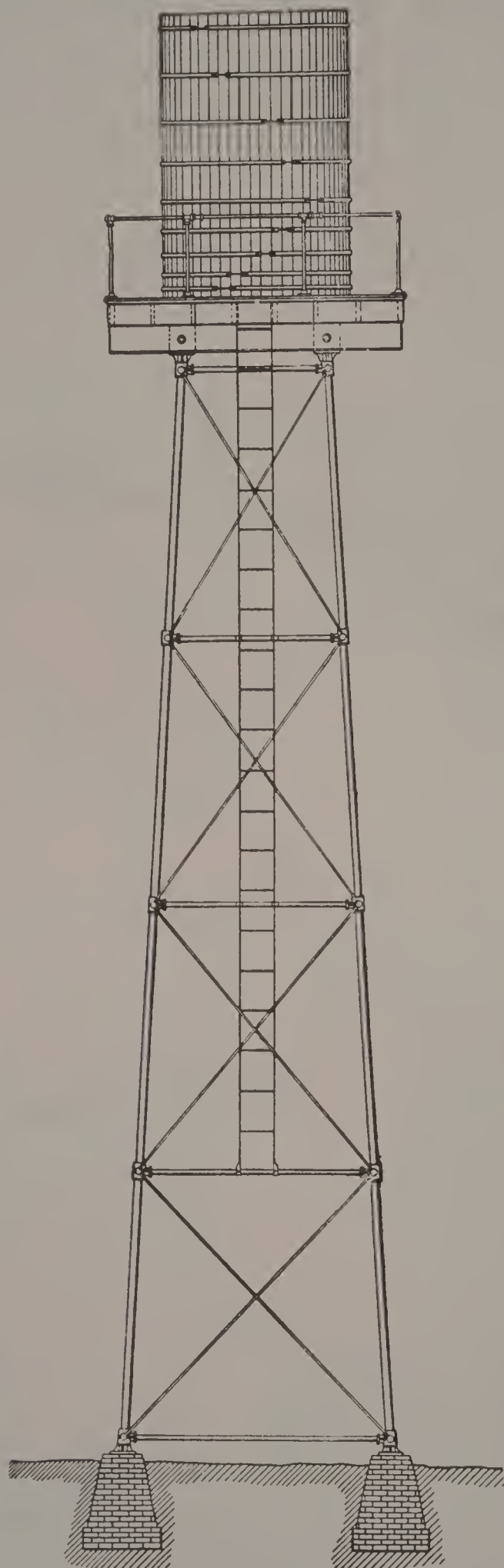


Figure 103.

TOWER AND TANK.

Made in Our Shops.

Write us for Prices on Tank Towers.

TANKS.

IRON TANKS.

Diam.	Height	Gallons.	Legal Barrels.	Weight	Thickness of Metal.		Price F. O. B. Factory. *See Foot Note.		
					Side.	Bottom	No. 1.	No. 2.	No. 3.
3 ft.	3 ft.	158.6	4.8	243	No. 10	No. 10	\$ 38.00	\$ 34.50	\$ 58.00
3 "	5 "	264.3	8.0	357	" 10	" 10	53.00	47.35	73.00
5 "	3 "	440.5	13.0	516	" 8	" 8	72.00	64.60	92.00
4 "	4 "	375.9	11.4	460	" 9	" 9	59.00	51.75	79.00
4 "	6 "	563.8	17.0	665	" 8	" 8	76.00	66.00	96.00
6 "	4 "	845.7	25.6	830	" 8	" 8	100.00	84.75	120.00
5 "	5 "	734.2	22.2	780	" 8	" 8	94.00	79.75	114.00
5 "	7 "	1027.8	31.0	1004	" 8	" 8	120.00	103.22	140.00
7 "	5 "	1439.0	43.6	1180	" 8	" 8	128.00	99.00	148.00
6 "	6 "	1268.6	32.4	1103	" 8	" 8	121.00	93.75	141.00
6 "	8 "	1691.5	51.2	1376	" 8	" 8	138.00	104.25	158.00
8 "	6 "	2255.4	68.3	1626	" 8	" 8	162.50	123.00	182.50
7 "	7 "	2014.6	61.0	1510	" 8	" 8	151.00	115.75	171.00
7 "	9 "	2590.2	78.5	1825	" 8	" 8	182.50	145.50	202.50
9 "	7 "	3331.0	100.9	2080	" 8	" 8	208.00	157.00	228.00
8 "	8 "	3007.0	91.1	1980	" 8	" 8	198.00	150.00	210.00
8 "	10 "	3759.0	113.9	2340	" 8	" 8	234.00	187.00	254.00
10 "	8 "	4699.8	142.4	2648	" 8	" 8	264.50	200.25	284.50
8 "	9 "	4282.7	129.7	2468	" 8	" 8	248.60	186.60	268.60
9 "	11 "	5234.4	158.6	2892	" 8	" 8	289.20	229.70	309.20
11 "	9 "	6396.2	193.8	3146	" 8	" 8	314.60	236.10	334.60
10 "	10 "	5874.8	178.0	3093	" 8	" 8	309.30	233.30	329.30
10 "	12 "	7049.7	213.6	3541	" 8	" 8	354.10	283.10	374.10
12 "	10 "	8481.0	257.0	3740	" 8	" 8	335.30	257.50	375.30
12 "	12 "	10178.3	308.4	4280	" 8	" 8	402.80	309.80	422.80
12 "	14 "	11874.6	359.8	4870	" 8	" 8	462.65	358.00	482.65
14 "	12 "	13814.5	318.6	5114	" 8	" 8	480.71	350.00	500.71
14 "	14 "	16116.9	488.3	6680	$\frac{3}{16}$ "	$\frac{3}{16}$ "	627.92	488.00	647.90
14 "	16 "	18419.4	558.1	7400	$\frac{3}{16}$ "	$\frac{3}{16}$ "	695.60	531.00	715.60
16 "	14 "	21050.7	637.9	7660	$\frac{3}{16}$ "	$\frac{3}{16}$ "	704.72	530.00	724.71
16 "	16 "	24058.0	729.0	8580	$\frac{3}{16}$ "	$\frac{3}{16}$ "	789.36	597.00	809.36
16 "	18 "	27065.2	820.1	9400	$\frac{3}{16}$ "	$\frac{3}{16}$ "	864.80	654.80	884.80
18 "	16 "	30448.4	922.6	9860	$\frac{3}{16}$ "	$\frac{3}{16}$ "	908.96	680.00	928.96
18 "	18 "	34254.4	1038.0	10800	$\frac{3}{16}$ "	$\frac{3}{16}$ "	972.00	725.50	992.00
18 "	20 "	38060.5	1153.3	11785	$\frac{3}{16}$ "	$\frac{3}{16}$ "	1060.65	794.65	1080.65
20 "	18 "	42298.5	1281.0	14253	$\frac{3}{16}$ " $\frac{1}{4}$ "	$\frac{1}{4}$ "	1282.77	984.00	1302.77
20 "	20 "	46998.3	1424.1	15360	$\frac{3}{16}$ " $\frac{1}{4}$ "	$\frac{1}{4}$ "	1382.40	1062.50	1402.40
20 "	22 "	51698.1	1566.6	16420	$\frac{3}{16}$ " $\frac{1}{4}$ "	$\frac{1}{4}$ "	1477.80	1195.00	1497.80
22 "	20 "	56855.8	1722.9	17600	$\frac{3}{16}$ " $\frac{1}{4}$ "	$\frac{1}{4}$ "	1584.00	1209.00	1604.00

*FOOT NOTE. LEGAL BARREL 31½ GALS.

- No. 1. Price is for tank complete F. O. B. Factory.
- No. 2. Price is for tank rolled and punched with rivets.
- No. 3. Price is for tank rolled and punched with rivets and including time of man and help to rivet up in place. Purchaser to pay freight and railroad fare of man.

For tanks delivered and set up without expense to purchaser add estimated traveling expenses to list No. 3.

TANKS, CISTERNS AND VATS
OF ALL SIZES AND FOR ALL PURPOSES.

Gallons.	Ap. Weight in Pounds.	PRICE.				CAPACITY OF TANKS.					
		Pine.	Tupelo.	Cypress.	Oak.	Diameter in the Clear		1 foot deep in the clear will hold.	Diameter in the clear.		1 foot deep in the clear will hold.
500	400 lbs.	\$ 11 50	\$ 12 00	\$ 14 00	\$ 16 00	ft.	in.	galls.	ft.	in.	galls.
750	500 "	12 80	15 00	16 00	18 00	2		23½	10	6	648
1000	600 "	16 20	16 50	19 00	22 00	2	6	37	11		710
1250	700 "	17 20	18 00	22 00	26 00	3		52	11	6	778
1500	800 "	20 00	21 00	25 00	30 00	3	6	72	12		846
1750	900 "	22 40	23 50	28 00	35 00	4		94	12	6	918
2000	1000 "	25 60	26 00	32 00	40 00	4	3	106	13		995
2500	1100 "	28 80	29 00	36 00	45 00	4	6	118	13	6	1070
3000	1200 "	32 00	32 00	40 00	48 00	4	9	133	14		1150
3500	1500 "	36 80	36 50	45 00	52 00	5		147	14	6	1238
4000	1700 "	41 60	40 50	52 00	55 00	5	3	162	15		1321
4500	1900 "	44 00	45 00	55 00	60 00	5	6	177	15	6	1400
5000	2100 "	48 00	49 00	60 00	65 00	5	9	195	16		1500
6000	2300 "	54 00	51 00	68 00	72 50	6		212	16	6	1600
7000	2500 "	60 00	58 00	75 00	80 00	6	3	230	17		1697
8000	2700 "	66 00	61 00	82 00	90 00	6	6	248	18		1902
9000	2900 "	72 00	70 00	90 00	100 00	6	9	268	19		2120
10000	3300 "	80 00	80 00	100 00	110 00	7		287	20		2350
12500	4200 "	88 00	90 00	110 00	120 00	7	3	310	21		2590
15000	4500 "	96 60	98 00	120 00	132 00	7	6	330	22		2843
17000	5000 "	105 60	112 00	132 00	145 00	7	9	355	23		3107
20000	5500 "	116 00	123 25	145 00	160 00	8		376	24		3383
25000	6500 "	128 00	135 00	160 00	190 00	8	3	400	25		3671
30000	7500 "	152 00	159 50	190 00	215 00	8	6	424	26		3771
35000	8500 "	174 70	182 50	215 00	235 00	8	9	450	27		4282
40000	9500 "	188 00	200 00	235 00	250 00	9		475	28		4605
45000	10000 "	200 00	215 00	250 00	275 00	9	6	530	29		4940
50000	10600 "	220 00	233 00	275 00	300 00	10	0	587	30		5287

There are 7½ gallons in one cubic foot. Therefore to find capacity of square tanks, multiply the length, breadth and depth in feet, inside measurement, and multiply this product by 7½, which will give the number of gallons. One gal-
lon of water weighs 8⅓ lbs.

We call your attention to Tupelo wood which is very similar to Cypress. It is very close grained, almost impossible to split and will last a lifetime.

The Tupelo Tank for storage of CRUDE OIL is far superior to any other wood known and cheaper than iron tanks. It is tasteless for water storage.

The D. A. Tompkins Company

Charlotte, N. C.

POWER TRANSMITTING
MACHINERY

We Make Contracts for Complete Plants

Castings of all Kinds

Repair Work

Price List, Shafting.

Size.	Price per lb.	Weight per ft.	Price per ft.	Size.	Price per lb.	Weight per ft.	Price per ft.	Size.	Price per lb.	Weight per ft.	Price per ft.
$\frac{3}{16}$	\$0.10	.005	\$0.01	$1\frac{1}{8}$	\$0.05 $\frac{1}{2}$	3.38	\$0.19	$2\frac{1}{8}$	\$0.05	21.15	\$1.06
$\frac{7}{32}$	.10	.130	.02	$1\frac{3}{16}$	.05 $\frac{1}{2}$	3.77	.21	$2\frac{7}{8}$	.05	22.09	1.11
$\frac{1}{4}$	.10	.167	.02	$1\frac{2}{10}$	.05 $\frac{1}{2}$	3.86	.22	$2\frac{1}{2}$	.05	23.06	1.16
$\frac{5}{16}$	.08 $\frac{1}{2}$	.260	.02	$1\frac{1}{4}$	.05 $\frac{1}{2}$	4.17	.23	3	.05	24.05	1.21
$\frac{11}{32}$	.08 $\frac{1}{2}$	.320	.03	$1\frac{5}{16}$	.05 $\frac{1}{2}$	4.61	.26	$3\frac{1}{8}$	.05 $\frac{1}{4}$	26.09	1.37
$\frac{3}{8}$	.07	.375	.03	$1\frac{3}{8}$	.05 $\frac{1}{2}$	5.05	.28	$3\frac{3}{16}$	.05 $\frac{1}{4}$	27.16	1.43
$\frac{13}{32}$	.07	.450	.04	$1\frac{3}{2}$	.05 $\frac{1}{2}$	5.26	.29	$3\frac{1}{4}$	.05 $\frac{1}{4}$	28.22	1.49
$\frac{7}{16}$	.07	.511	.04	$1\frac{7}{16}$	.05 $\frac{1}{2}$	5.52	.31	$3\frac{3}{8}$	.05 $\frac{1}{4}$	30.43	1.60
$\frac{15}{32}$	.07	.586	.05	$1\frac{5}{2}$	.05	5.60	.31	$3\frac{7}{16}$	.05 $\frac{1}{4}$	31.58	1.66
$\frac{1}{2}$	.07	.667	.05	$1\frac{1}{2}$	.05	6.01	.31	$3\frac{1}{2}$	.05 $\frac{1}{2}$	32.73	1.81
$\frac{9}{16}$	.06	.845	.06	$1\frac{5}{8}$	.05	7.06	.36	$3\frac{5}{8}$	.05 $\frac{1}{2}$	35.20	1.94
$\frac{19}{32}$	.06	1.00	.06	$1\frac{1}{6}$	.05	7.61	.39	$3\frac{1}{6}$	.05 $\frac{1}{2}$	36.40	2.01
$\frac{5}{8}$	.06	1.05	.07	$1\frac{3}{4}$	.05	8.18	.41	$3\frac{3}{4}$	.05 $\frac{1}{2}$	37.57	2.07
$2\frac{1}{2}$	.06	1.17	.08	$1\frac{1}{6}$	.05	8.78	.44	$3\frac{7}{8}$	.05 $\frac{1}{2}$	39.95	2.20
$2\frac{1}{2}$	.06	1.26	.08	$1\frac{7}{8}$	.05	9.39	.47	$3\frac{1}{6}$	.05 $\frac{1}{2}$	41.25	2.27
$2\frac{3}{2}$	.06	1.38	.09	$1\frac{5}{6}$	.05	10.03	.51	4	.06	42.75	2.57
$\frac{3}{4}$	.05 $\frac{1}{2}$	1.50	.09	2	.05	10.69	.54	$4\frac{3}{16}$	.06	47.40	2.85
$\frac{13}{16}$	.05 $\frac{1}{2}$	1.77	.10	$2\frac{1}{6}$	.05	11.35	.57	$4\frac{1}{4}$	.06	48.26	2.90
$\frac{53}{64}$	.05 $\frac{1}{2}$	1.90	.11	$2\frac{1}{8}$	.05	12.07	.61	$4\frac{3}{8}$	.06	51.80	3.11
$2\frac{7}{32}$	.05 $\frac{1}{2}$	1.94	.11	$2\frac{3}{16}$	.05	12.80	.65	$4\frac{7}{16}$	.06	52.62	3.16
$\frac{7}{8}$	.05 $\frac{1}{2}$	2.05	.12	$2\frac{1}{4}$	.05	13.52	.68	$4\frac{1}{2}$	.06 $\frac{1}{2}$	54.11	3.52
$2\frac{9}{8}$	.05 $\frac{1}{2}$	2.20	.13	$2\frac{5}{16}$	.05	14.35	.72	$4\frac{1}{6}$	.06 $\frac{1}{2}$	58.66	3.82
$\frac{15}{8}$	.05 $\frac{1}{2}$	2.35	.13	$2\frac{3}{8}$	.05	15.07	.76	$4\frac{3}{4}$	.06 $\frac{1}{2}$	60.88	3.96
$\frac{31}{16}$	.05 $\frac{1}{2}$	2.52	.14	$2\frac{7}{8}$	.05	15.89	.80	$4\frac{5}{6}$	.06 $\frac{1}{2}$	65.50	4.26
$\frac{3}{2}$	.05 $\frac{1}{2}$	2.68	.15	$2\frac{1}{2}$	.05	16.70	.84	5	.07	67.45	4.72
$1\frac{1}{16}$	.05 $\frac{1}{2}$	3.02	.17	$2\frac{9}{16}$	.05	17.55	.88				
$1\frac{5}{16}$	.05 $\frac{1}{2}$	3.11	.17	$2\frac{5}{8}$	.05	18.41	.93				
$1\frac{3}{2}$	.05 $\frac{1}{2}$	3.20	.18	$2\frac{1}{6}$	.05	19.31	.97				
				$2\frac{3}{4}$	.05	20.21	1.02				

The above prices are for shafts from 1 foot to 24 feet long inclusive.
For shafts 6 to $11\frac{1}{4}$ inches long, $\frac{1}{2}$ cent per pound net extra.
For shafts 3 to $5\frac{3}{4}$ inches long, 1 cent per pound net extra.
For shafts shorter than 3 inches, special prices will be quoted.
For shafts over 24 feet long and less than 30 feet, $\frac{1}{2}$ cent per pound net extra.
For shafts 30 feet long and less than 35 feet, 1 cent per pound net extra.
For shafts 35 feet long and less than 40 feet, $1\frac{1}{2}$ cents per pound net extra.
For shafts 40 feet long and less than 45 feet, 2 cents per pound net extra.
For shafts 45 feet long and over, $2\frac{1}{2}$ cents per pound net extra.

Boxing at cost.

RIBBED COMPRESSION COUPLINGS.



Figure 104.

All compression couplings furnished complete with keys and socket wrenches when required.

Couplings furnished with keys and bolts and fitted for shafts.

A low priced and desirable coupling.

PRICE LIST.

Size of Shaft.	Price.	Size of Shaft.	Price.
1 $\frac{3}{16}$ in.	\$3.05	2 $\frac{1}{16}$ in.	\$11.00
1 $\frac{5}{16}$ "	3.65	2 $\frac{5}{16}$ "	13.00
1 $\frac{7}{16}$ "	4.20	3 $\frac{3}{16}$ "	16.50
1 $\frac{1}{2}$ "	6.30	3 $\frac{7}{16}$ "	20.00
1 $\frac{5}{8}$ "	7.40	3 $\frac{1}{2}$ "	24.00
2 $\frac{3}{16}$ "	9.00	3 $\frac{1}{2}$ "	28.00
2 $\frac{7}{16}$ "	10.00	4 $\frac{7}{16}$ "	38.00

IMPROVED COLLINS COMPRESSION
COUPLINGS

WITH INTERLOCKING KEYS AND INCLINED KEY-SEATS IN
COUPLING AND SHAFTS.

The sleeve, which is in halves, is bored *somewhat smaller* than the diameter of the shaft. When the cone rings are driven well home by a copper or babbitt metal hammer or block of hard wood, and locked by the ring nuts on either end, the sleeve is so compressed upon the shaft as to prevent the slightest movement in the connection. As the shafts are not turned down at the ends, the *necessity for centering or putting them in a lathe is obviated* and the entire strength is preserved.

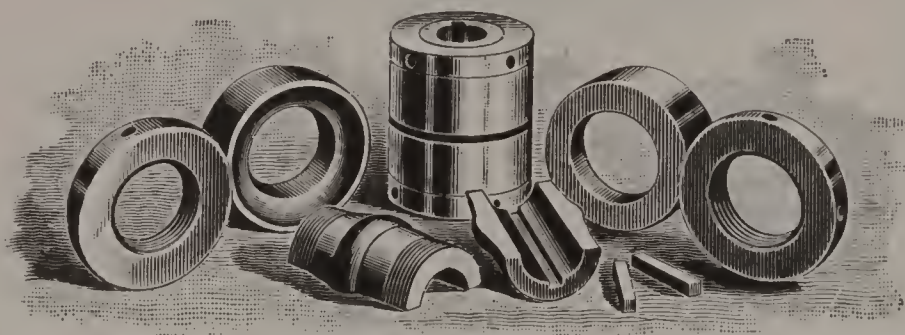


Figure 105.

Size.	Price.	Size.	Price.	Size.	Price.
1 in.	\$4.50	2 in.	\$8.25	3 in.	\$19.35
1 1/8 "	4.60	2 1/8 "	9.25	3 1/4 "	23.90
1 1/4 "	4.75	2 1/4 "	10.35	3 1/2 "	28.15
1 3/8 "	5.10	2 3/8 "	11.75	3 3/4 "	32.15
1 1/2 "	5.50	2 1/2 "	13.10	4 "	37.60
1 5/8 "	6.10	2 5/8 "	14.50	4 1/4 "	43.50
1 3/4 "	6.75	2 3/4 "	15.85	4 1/2 "	49.75
1 7/8 "	7.50	2 7/8 "	17.60	4 3/4 "	56.00
				5 "	66.00

NOTE—For reducing couplings add 10 per cent. to the price of the larger size,

FLANGE COUPLINGS

FINISHED ALL OVER WITH TIGHT-FITTING BOLTS AND KEYS.

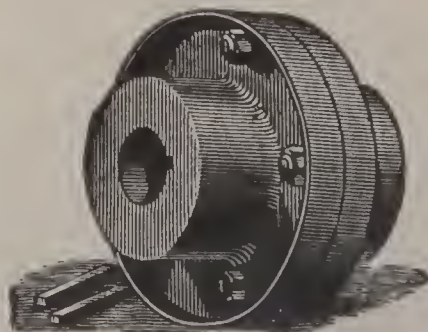


Figure 106.

Size of Shaft.	Price of Coup- ling.	Price for Fit- ting to Shafts.	Size of Shaft.	Price of Coup- ling.	Price for Fit- ting to Shafts.
1 in.	\$5.00	\$4.55	5 in.	\$ 52.50	\$11.00
1¼ "	5.85	4.65	5½ "	66.50	12.15
1½ "	6.80	4.75	6 "	81.60	13.35
1¾ "	7.95	5.00	6½ "	100.00	15.55
2 "	9.25	5.25	7 "	118.00	17.85
2¼ "	10.80	5.60	7½ "	141.00	20.60
2½ "	12.60	5.90	8 "	179.00	24.00
2¾ "	14.70	6.50	8½ "	213.00	28.00
3 "	17.15	6.90	9 "	247.00	32.75
3¼ "	20.80	7.60	9½ "	293.00	38.20
3½ "	24.25	8.25	10 "	330.00	44.55
3¾ "	28.30	8.90	10½ "	375.00	52.00
4 "	33.00	9.25	11 "	411.00	60.00
4¼ "	38.50	9.75	11½ "	477.00	70.00
4½ "	44.90	10.25	12 "	514.00	81.50

For reducing Couplings add 10 per cent. to the price of the larger size.

UNIVERSAL COUPLINGS.

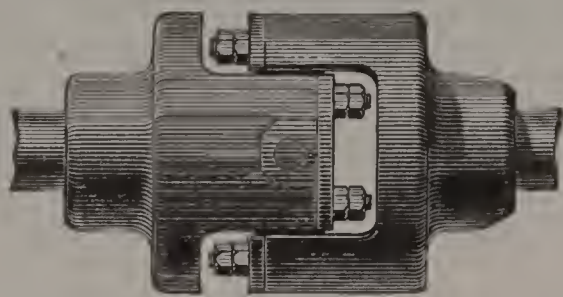


Figure 107.

Size.	Price.	Size.	Price.
2 in.	\$ 70.00	4 in.	\$ 150.00
2½ “	80.00	4½ “	185.00
3 “	95.00	5 “	230.00
3½ “	120.00		

CLUTCH COUPLINGS.

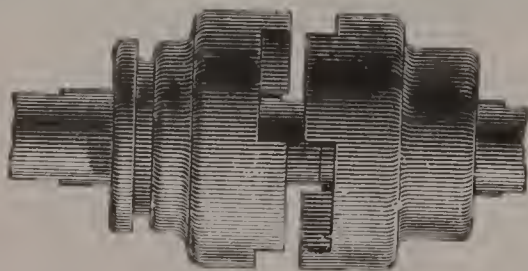


Figure 108.

Size of Shaft.	Price of Couplings.	Price of Shipper.	Size of Shaft.	Price of Couplings.	Price of Shipper.
1½ in.	\$20.00	\$8.00	3¾ in.	\$54.00	\$11.50
1¾ “	22.50	8.20	4 “	60.75	12.00
2 “	25.00	8.40	4¼ “	68.35	12.50
2¼ “	27.50	8.80	4½ “	76.90	13.00
2½ “	30.00	9.25	5 “	97.25	15.00
2¾ “	33.75	9.60	6 “	123.00	19.00
3 “	38.00	10.00	7 “	164.00	25.00
3¼ “	42.75	10.50	8 “	219.00	30.00
3½ “	48.10	11.00	9 “	292.00	35.00

Price List of the Orton Clutch.

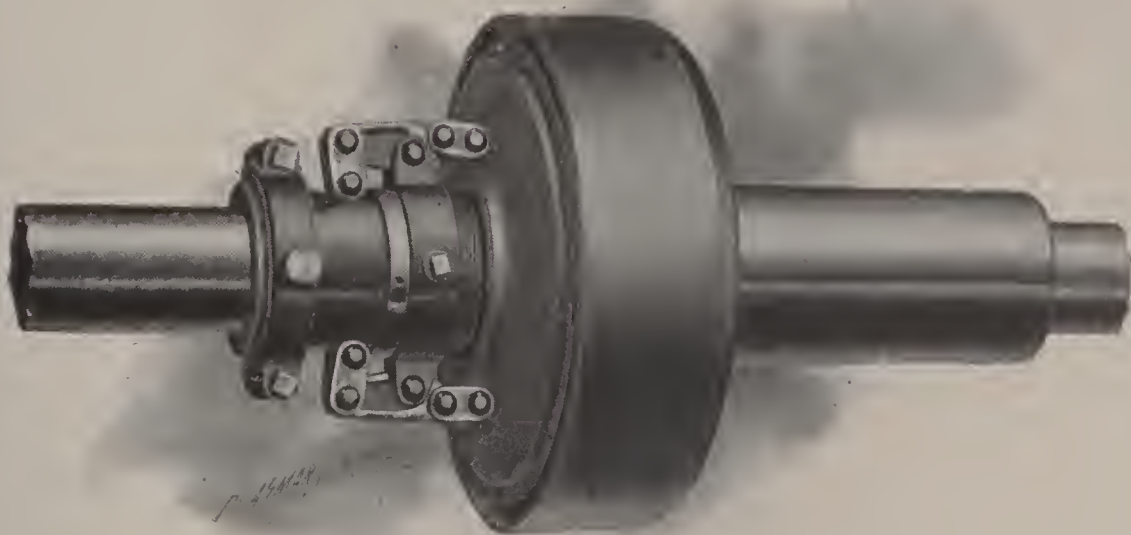


Figure 109.

Size of Clutch.	Largest Size Clutch will Bore.	Extreme Outside Diameter in Inches.	H. P. at 100 Revs.	Will Drive Pulley as large as		Price List.	Standard Sleeve.	
				Diameter.	Face		Outside Diam.	Length.
4 In.	1 ⁵ / ₁₆ In.	5 ³ / ₈ In.	1 ¹ / ₄	12	4	\$15 00	2 ³ / ₁₆	4 ¹ / ₂
5 "	1 ⁹ / ₁₆ "	6 ¹ / ₂ "	2	15	4	17 50	2 ⁷ / ₁₆	5
6 "	1 ¹³ / ₁₆ "	7 ¹ / ₁₆ "	3	16	5	20 00	2 ¹¹ / ₁₆	6
7 "	1 ¹⁵ / ₁₆ "	8 ⁷ / ₈ "	4	20	6	22 50	3	7
8 "	2 ³ / ₁₆ "	10 ¹ / ₈ "	5	24	6	27 00	3 ³ / ₁₆	8
9 "	2 ⁹ / ₁₆ "	11 ³ / ₈ "	6	30	6	30 00	3 ³ / ₄	10
10 "	2 ¹⁵ / ₁₆ "	12 ⁵ / ₈ "	10	30	10	37 00	4 ³ / ₈	11
12 "	3 ¹⁵ / ₁₆ "	15 ¹ / ₈ "	15	36	12	45 00	5 ¹¹ / ₁₆	12
14 "	4 ¹⁵ / ₁₆ "	17 ⁵ / ₈ "	20	40	14	55 00	6 ¹ / ₂	13
16 "	5 ¹⁵ / ₁₆ "	19 ¹ / ₄ "	25	48	14	75 00	8	14

STEEL LOOSE COLLARS

WITH STEEL SET SCREWS

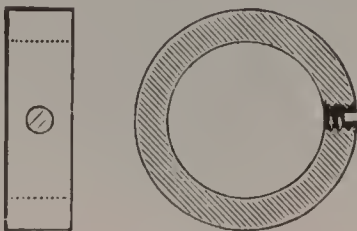


Figure 110.

NOTE—With these ring-oiling bearings *no outside collars* should be used.

Diameter of Shaft	Price	Diameter of Shaft	Price	Diameter of Shaft	Price
1 in.	\$1.20	2 in.	\$1.40	3 in.	\$2.50
1 1/8 "	1.20	2 1/8 "	1.45	3 1/4 "	2.75
1 1/4 "	1.20	2 1/4 "	1.50	3 1/2 "	3.00
1 3/8 "	1.20	2 3/8 "	1.65	3 3/4 "	3.50
1 1/2 "	1.25	2 1/2 "	1.80	4 "	4.00
1 5/8 "	1.25	2 5/8 "	1.95	4 1/2 "	5.00
1 3/4 "	.30	2 3/4 "	2.10	5 "	6.00
1 7/8 "	.35	2 7/8 "	2.30	6 "	7.00

CONCEALED COLLAR AND RECESSED BEARING

FOR HEAD SHAFT OF LINES OF SHAFTING

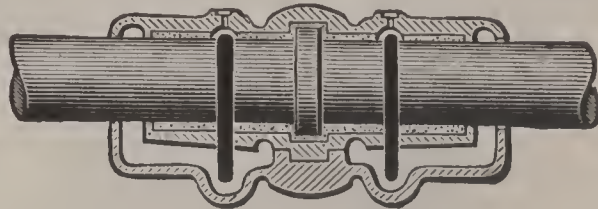


Figure 111.

BEARINGS WITH ENDS CLOSED

FOR COUNTER SHAFTS

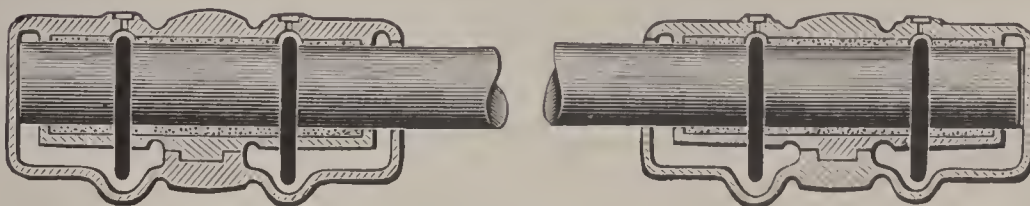


Figure 112.

In cotton and other mills where cleanliness is indispensable, collars or shafts outside of the bearings are objectionable because of their liability to throw oil. The system illustrated above avoids this. In every case where this system has been used it has given entire satisfaction.

Price of *concealed collar*, or for closing the ends of a pair of bearings, same as the price of a pair of collars given in list on opposite page.

NOTE—With these ring-oiling bearings *no outside* collars should be used.

SELF-OILING BEARINGS

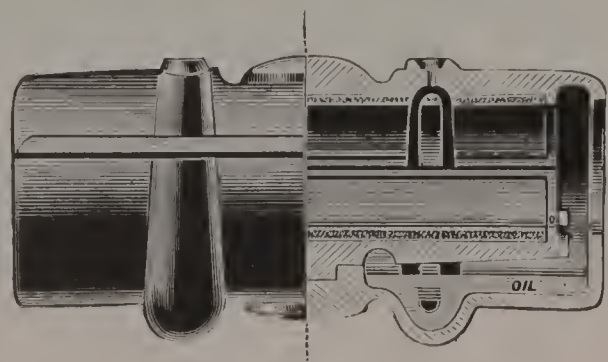


Figure 113.

RING-OILING BEARING.

DIRECTIONS FOR USING RING-OIL BEARINGS.

FOLLOW THESE DIRECTIONS CAREFULLY, AND NOT ONLY WILL YOU HAVE SATISFACTORY LUBRICATION, BUT YOU WILL SAVE MUCH OIL.

On all hangers 2" and larger, the brass springs should be so adjusted that when the shaft is placed in position it will depress the scrapers about 1/4". This will allow them to wear that amount before it is necessary to readjust them. A greater depression would cause increased friction and consequent wear. On sizes less than 2", 1/8" to 3-16" is about right.

The oiling rings should be put in carefully and the two ends brought nicely together, so that they will not catch in turning on the shaft.

We recommend, as the proper amount of oil for the various sizes, as follows :

1 1/2	inch	Hanger,	1/4	pint	oil.	3 1/2	inch	Hanger,	1 1/2	pint	oil.
1 3/4	"	"	1/4	"		3 3/4	"	"	1 1/2	"	
2	"	"	1/2	"		4	"	"	1	quart	oil.
2 1/4	"	"	1/2	"		4 1/4	"	"	1 1/2	"	
2 1/2	"	"	1/2	"		4 1/2	"	"	1 1/2	"	
2 3/4	"	"	3/4	"		5	"	"	2	"	
3	"	"	1	"		5 1/2	"	"	2 1/2	"	
3 1/4	"	"	1 1/2	"		6	"	"	3	"	

After starting the shafting, the bearings should be carefully watched for a few days, and if any of them become warm the upper half of the bearing should be removed to ascertain the cause of the heat. Being properly started, they should run without trouble for at least a year.

RING-OILING BALL AND SOCKET HEAD SHAFT
HANGERS

WITH VERTICAL AND HORIZONTAL ADJUSTMENT
BEARINGS LINED WITH GENUINE BABBITT

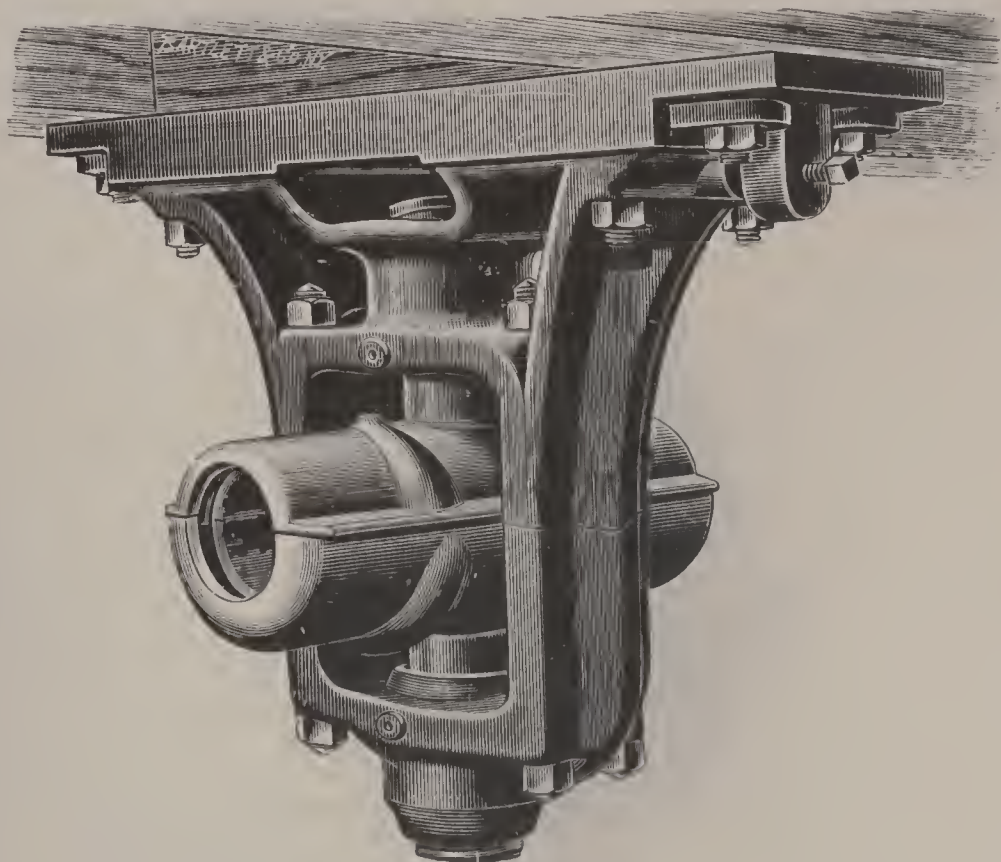


Figure 114.

Length of Bearings=5 diameters of Shaft.
Also length of Bearings=4 diameters of Shaft for Shafts 2 3/8" and larger.
This Hanger is designed for supporting *safely* and *securely* heavy head shaft carrying main driving pulleys transmitting the duty of double and triple belts. It is strong, heavy and well proportioned.

Ring-Oiling Ball and Socket Head Shaft Hangers
and Shoes.

Size of Shaft.	8-inch Drop.	10-inch Drop.	13-inch Drop.	16-inch Drop.	19-inch Drop.	22-inch Drop.	Shoe 2" thick.	Shoe 3" deep.	Shoe 4" deep.
2"	\$11 60	\$12 05					\$5 90	\$6 20	\$7 10
2 1/4	12 60	13 05							
2 1/2	16 00	16 70	\$17 85	\$18 90	\$19 95	\$21 10	6 90	7 55	8 20
2 3/4	17 50	18 20	19 30	20 40	21 40	22 50			
3	21 80	22 50	24 10	25 70	27 30	28 90	9 10	10 00	11 00
3 1/4	23 80	24 50	26 10	27 70	29 30	30 90			
3 1/2	28 25	29 50	31 85	34 20	36 55	38 90	13 00	14 00	15 00
3 3/4	30 70	32 00	34 30	36 70	39 05	41 40			
4		42 50	45 00	47 50	50 00	52 50	14 25	15 50	16 75
4 1/4		45 50	48 00	50 50	53 00	55 50			
4 1/2		56 10	58 90	61 70	64 50	67 30	16 00	17 25	18 50
4 3/4		59 60	62 40	65 20	68 09	70 80			
5		70 00	74 55	79 10	83 05	88 20	18 70	20 00	21 50
5 1/2		85 00	90 00	95 00	100 00	105 00	20 50	24 30	26 00
6		101 00	107 00	113 00	119 00	125 00	22 60	25 75	27 75
6 1/2		131 00					25 00	27 00	29 50
7			168 00				31 00	36 30	42 80

RING-OILING ADJUSTABLE BALL AND
SOCKET LINE HANGERS

With Babbitted Bearings.

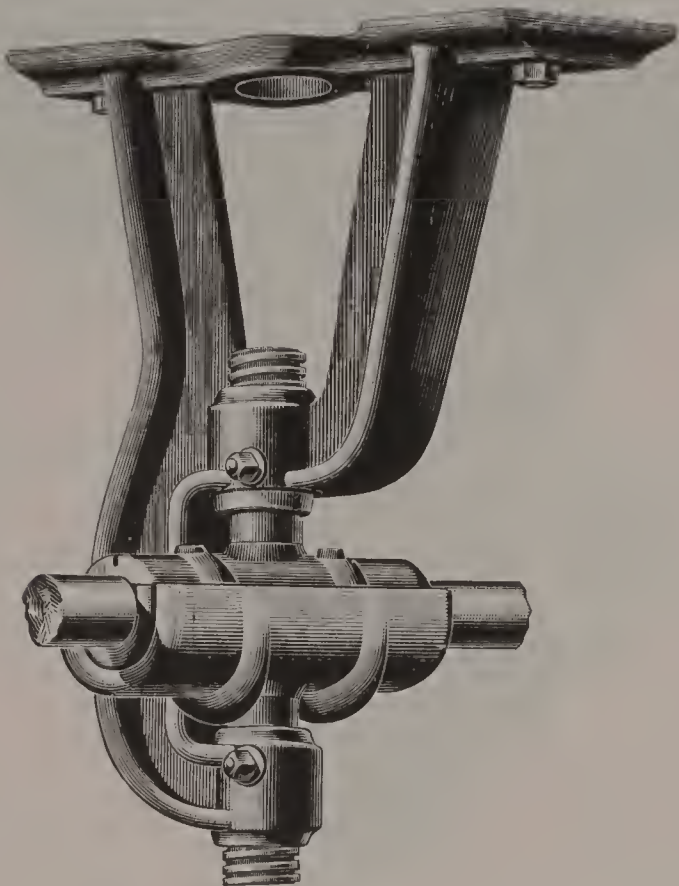


Figure 115.

Length of Bearings=5 diameters of Shaft.
Also length of Bearings=4 diameters of Shaft for 2⅜" and larger.
These Ring-Oiling Hangers are of the latest and best designs, and are fitted *carefully*. The threads in the frames and plungers are all *chased*, and the ends of the plungers are *milled* to secure a good fit on the boxes, which also are milled. This insures the bearings being held *perfectly in line*.

Size of Shaft.	8 inch Drop.	9 inch Drop.	10 inch Drop.	12 inch Drop.	13 inch Drop.	15 inch Drop.	18 inch Drop.	21 inch Drop.	24 inch Drop.	27 inch Drop.	30 inch Drop.	33 inch Drop.	36 inch Drop.	Size of Shaft.
1¼"	\$3 70	\$3 75	\$3 80	\$4 00	\$4 10	\$4 35	\$4 80	\$5 30	\$5 90					1¼"
1⅜	4 20	4 35	4 50	4 80	5 05	5 40	5 65	6 20	6 65					1⅜
1½	4 30	4 45	4 60	4 90	5 05	5 50	5 75	6 30	6 75					1½
1⅝	4 45	4 60	4 75	5 05	5 30	5 65	5 90	6 45	6 90					1⅝
1¾	5 10	5 30	5 50	5 85	6 15	6 65	7 10	7 55	8 20	\$9 00				1¾
1⅞	6 45	6 65	6 85	7 30	7 45	7 95	8 65	9 35	10 00	11 85				1⅞
2	6 60	6 80	7 00	7 45	7 60	8 10	8 80	9 50	10 15	11 00	\$13 25	\$14 50	\$15 75	2
2⅛	6 80	7 00	7 20	7 65	7 80	8 30	9 00	9 70	10 35	11 20	13 45	14 75	16 00	2⅛
2¼	7 00	7 20	7 40	7 85	8 00	8 50	9 20	9 90	10 55	11 40	13 65	15 00	16 25	2¼
2⅝	8 40	8 80	9 15	9 80	10 15	10 80	11 55	12 30	13 05	13 80	14 55	17 25	19 20	2⅝
2½	8 60	9 00	9 35	10 00	10 35	11 00	11 75	12 50	13 25	14 00	14 75	17 50	19 60	2½
2⅞	8 85	9 25	9 60	10 25	10 60	11 25	12 00	12 75	13 50	14 25	15 00	17 75	20 00	2⅞
2¾	9 10	9 50	9 85	10 50	10 85	11 50	12 25	13 00	13 75	14 50	15 25	18 00	20 50	2¾
2⅞	12 25	12 90	13 55	14 85	15 50	16 75	18 00	19 25	20 50	21 75	23 00	24 25	25 50	2⅞
3	12 50	13 15	13 80	15 10	15 75	17 00	18 25	19 50	20 75	23 00	23 25	24 50	26 00	3
3¼	13 25	13 90	14 55	15 85	16 50	17 75	19 00	20 25	21 50	22 75	24 00	25 25	26 75	3¼
3½			18 15	19 50	20 40	22 20	24 90	27 60	30 30	33 00	35 70	38 40	41 00	3½
3¾			19 15	20 50	21 40	23 20	24 90	28 60	31 30	34 00	36 70	39 40	42 00	3¾
4			28 90	30 50	32 00	34 30	37 60	40 90	44 20	47 50	50 80	54 10	57 40	4
4½			38 00	39 00	40 15	42 50	45 00	47 50	50 00	52 50	55 00	57 50	60 00	4½

RING-OILING BALL AND SOCKET POST
HANGERS.

WITH BABBITTED BEARINGS.

Length of Bearings=5 diameters of Shaft.

Also length of Bearings=4 diameters of Shaft for 2 3/8" and larger.

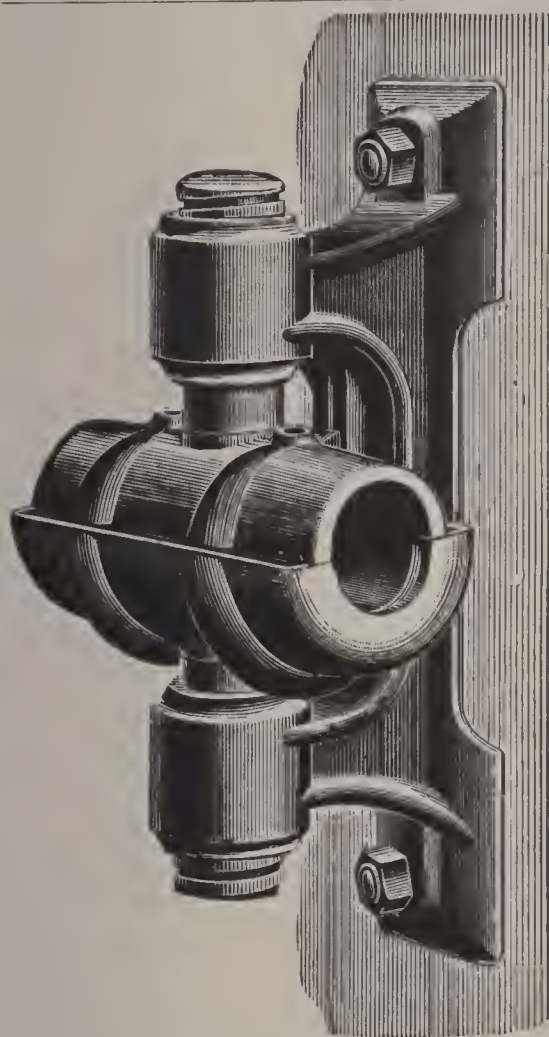


Figure 116.

Size.	Price.	From Post to Center of Shaft.
1 1/4 in.	\$3.60	6 in.
1 1/2 "	4.15	
1 5/8 "	4.35	
1 3/4 "	4.80	
1 7/8 "	6.30	
2 "	6.50	
2 1/8 "	6.70	
2 1/4 "	6.90	
2 3/8 "	9.50	
2 1/2 "	9.70	
2 5/8 "	9.95	
2 3/4 "	10.20	
2 7/8 "	14.25	8
3 "	14.50	
3 1/4 "	15.25	
3 1/2 "	18.25	
3 3/4 "	19.50	10
4 "	29.90	
4 1/4 "	31.50	
4 1/2 "	38.00	13 1/4
5 "	54.70	
5 1/2 "	72.50	
6 "	87.50	
6 1/2 "	90.00	
7 "	133.00	

RING-OILING BALL AND SOCKET PILLOW
BLOCKS

WITH BABBITTED BEARINGS

Length of Bearings=5 diameters of Shaft.
Also length of Bearings=4 diameters of Shaft for 2³/₈" and larger.

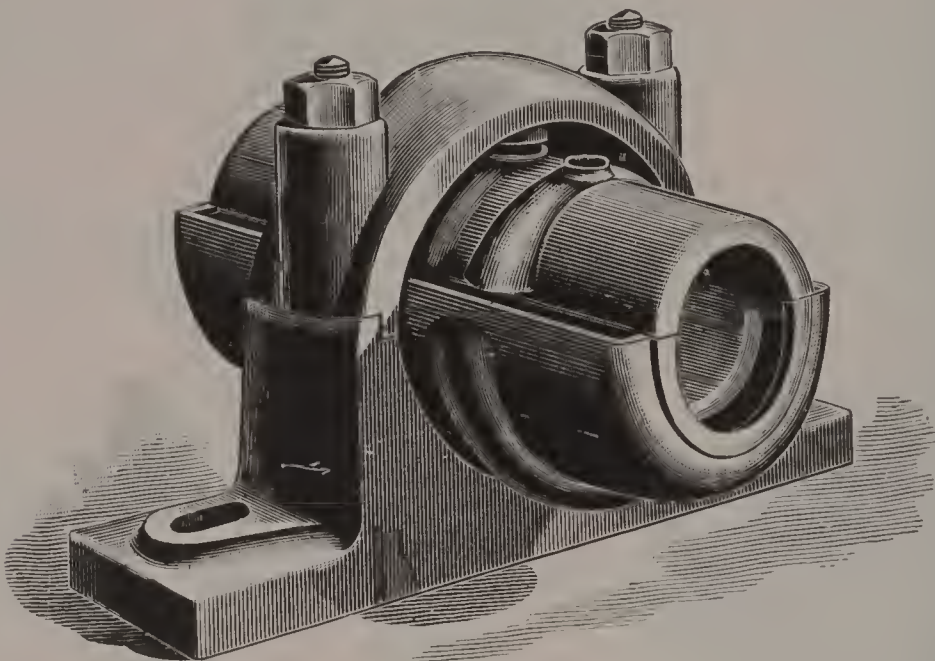


Figure 117.

Size.	Price.	From Base of Pillow Block to Center of Shaft.	From Bottom of Shoe or Wall Frame to Center of Shaft.	Size.	Price.	From Base of Pillow Block to Center of Shaft.	From Bottom of Shoe or Wall Frame to Center of Shaft.
1 ¹ / ₄ in.	\$3 60	2 ³ / ₁₆ in.	2 ³ / ₁₆ in.	3 ¹ / ₈ in.	\$ 15.30	5 ¹⁵ / ₁₆ in.	7 ⁶ / ₁₆ in.
1 ³ / ₈ "	3 90	2 ⁷ / ₈ "	3 ⁵ / ₈ "	3 ¹ / ₄ "	16.00	5 ¹⁵ / ₁₆ "	7 ⁶ / ₁₆ "
1 ¹ / ₂ "	4.00	2 ⁷ / ₈ "	3 ⁵ / ₈ "	3 ¹ / ₂ "	19.00	6 ³ / ₈ "	8 ¹ / ₈ "
1 ⁵ / ₈ "	5.15	3 ⁵ / ₁₆ "	4 ³ / ₁₆ "	3 ³ / ₄ "	24.00	6 ¹³ / ₁₆ "	8 ¹¹ / ₁₆ "
1 ³ / ₄ "	5.35	3 ⁵ / ₁₆ "	4 ³ / ₁₆ "	4 "	30.75	7 ¹ / ₄ "	9 ¹ / ₄ "
1 ⁷ / ₈ "	6.30	3 ³ / ₄ "	4 ³ / ₄ "	4 ¹ / ₄ "	33.40	8 ¹ / ₈ "	10 ³ / ₈ "
2 "	6.60	3 ³ / ₄ "	4 ³ / ₄ "	4 ¹ / ₂ "	37.50	8 ¹ / ₈ "	10 ³ / ₈ "
2 ¹ / ₈ "	8.00	4 ⁵ / ₁₆ "	5 ⁷ / ₁₆ "	5 "	47.70	9 "	11 ¹ / ₂ "
2 ¹ / ₄ "	8.35	4 ⁵ / ₁₆ "	5 ⁷ / ₁₆ "	5 ¹ / ₂ "	63.35	9 ⁷ / ₈ "	12 ⁵ / ₈ "
2 ³ / ₈ "	9.30	4 ⁵ / ₈ "	5 ⁷ / ₈ "	6 "	80.00	10 ³ / ₄ "	13 ³ / ₄ "
2 ¹ / ₂ "	9.70	4 ⁵ / ₈ "	5 ⁷ / ₈ "	6 ¹ / ₂ "	100 00	11 ⁵ / ₈ "	15 ⁵ / ₈ "
2 ⁵ / ₈ "	11.35	5 ¹ / ₁₆ "	6 ⁷ / ₁₆ "	7 "	122.35	12 ¹ / ₂ "	16 "
2 ³ / ₄ "	11.85	5 ¹ / ₁₆ "	6 ⁷ / ₁₆ "	7 ¹ / ₂ "	154.00	13 ³ / ₈ "	17 ⁵ / ₈ "
2 ⁷ / ₈ "	13.25	5 ¹ / ₂ "	7 "	8 "	177.00	14 ¹ / ₄ "	18 ¹ / ₄ "
3 "	13.85	5 ¹ / ₂ "	7 "				

RIGID PILLOW BLOCK

BABBITTED

Length of Bearings=3 diameters of Shaft.

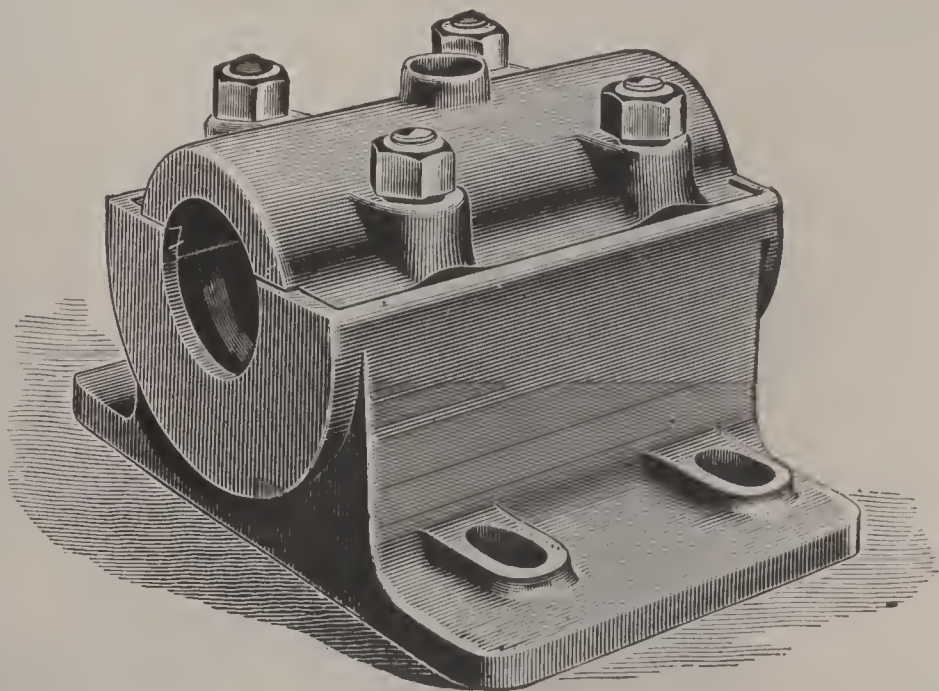


Figure 118.

Size.	Price.	From Bottom of Pillow Block to Center of Shaft.	From Bottom of Shoe or Wall Frame to Center of Shaft.
1 1/4 in.	\$1.70	1 1/4 in.	1 7/8 in.
1 1/2 "	1.90	1 1/2 "	2 1/4 "
1 3/4 "	2.25	1 3/4 "	2 5/8 "
2 "	2.90	2 "	3 "
2 1/4 "	3.55	2 1/4 "	3 3/8 "
2 1/2 "	4.45	2 1/2 "	3 3/4 "
2 3/4 "	5.60	2 3/4 "	4 1/8 "
3 "	7.20	3 "	4 1/2 "
3 1/4 "	8.60	3 1/4 "	4 7/8 "
3 1/2 "	10.20	3 1/2 "	5 1/4 "
3 3/4 "	12.60	3 3/4 "	5 5/8 "
4 "	15.70	4 "	6 "
4 1/4 "	18.60	4 1/4 "	6 3/8 "
4 1/2 "	24.15	4 1/2 "	6 3/4 "
5 "	28.40	5 "	7 1/2 "
5 1/2 "	35.35	5 1/2 "	8 1/4 "
6 "	43.00	6 "	9 "

The above is THE STANDARD Rigid Pillow Block. We have also a large variety of special patterns up to 10", for which we will give description on application.

RING-OILING BALL AND SOCKET HEAVY FLOOR STANDS

ADJUSTABLE IN EVERY DIRECTION

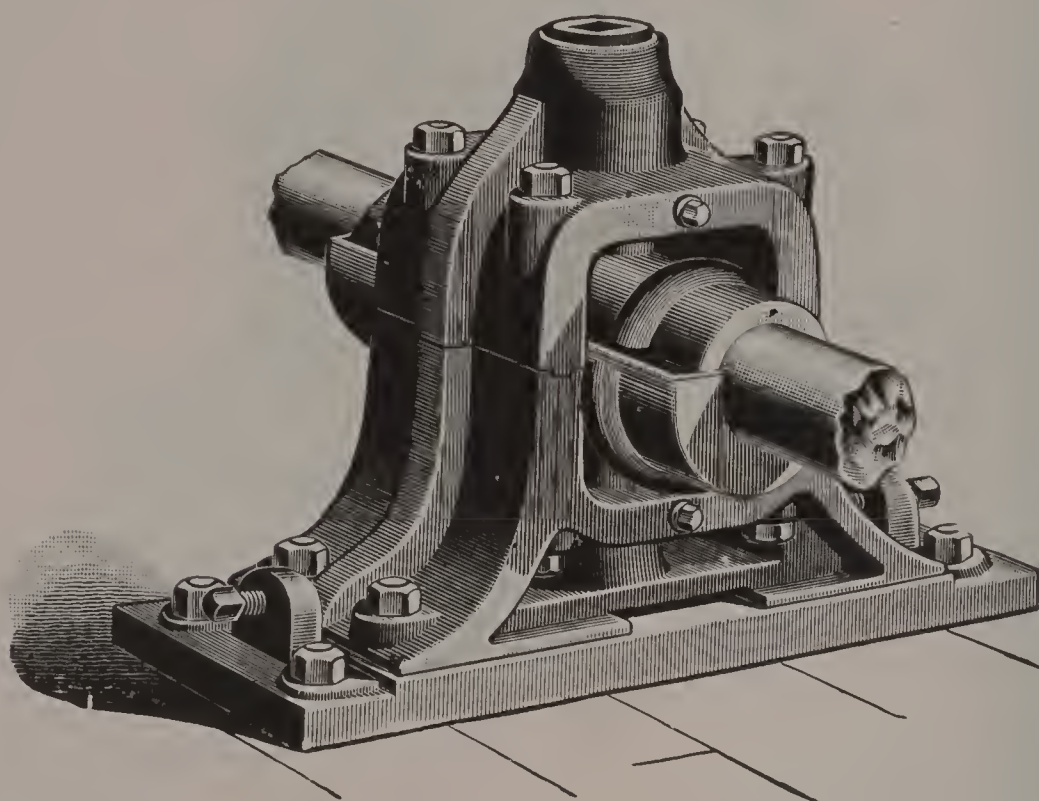


Figure 119.

Length of Bearings=5 diameters of Shaft.

Also length of Bearings=4 diameters of Shaft for Shafts $2\frac{3}{8}$ " and larger.

This Floor Stand is designed for supporting *safely* and *securely* heavy head shaft carrying main driving pulleys transmitting the duty of double and triple belts. It is strong, heavy and well proportioned.

Frequently employed as *Pillow Block* when great flexibility is necessary.

For Price List and Dimensions see those of Head Shaft Hangers, page 121.

RING-OILING BALL AND SOCKET FLOOR STANDS.

LIGHT PATTERN

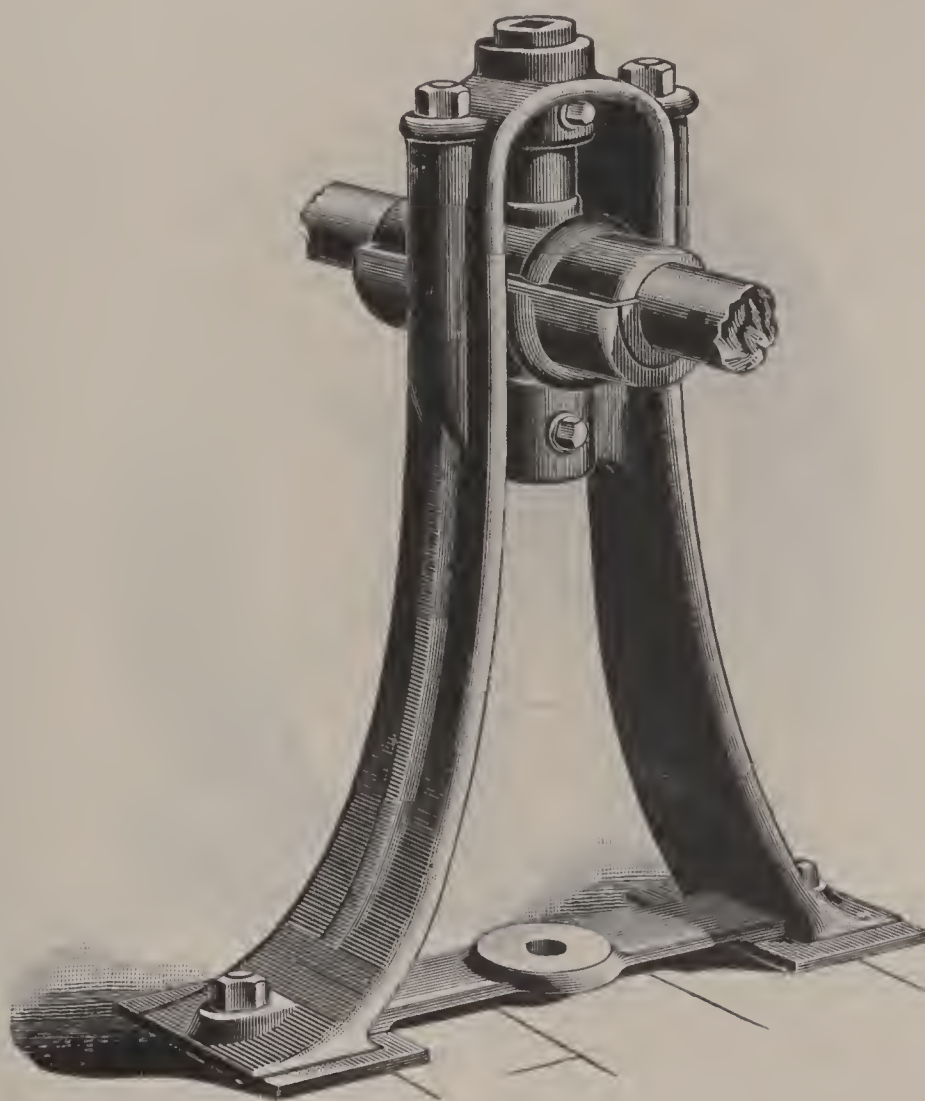


Figure 120.

Length of Bearings=5 diameters of Shaft.

Also length of Bearings=4 diameters of Shaft for $2\frac{3}{8}$ " and larger.

Our Ring-Oiling Floor Stands are of the latest and best designs, and are fitted *carefully*. The threads in the frames and plungers are all *chased*, and the ends of the plungers are *milled* to secure a good fit on the boxes, which also are milled. This insures the bearings being held *perfectly in line*.

For Price List see page 122,

PLAIN PULLEYS.

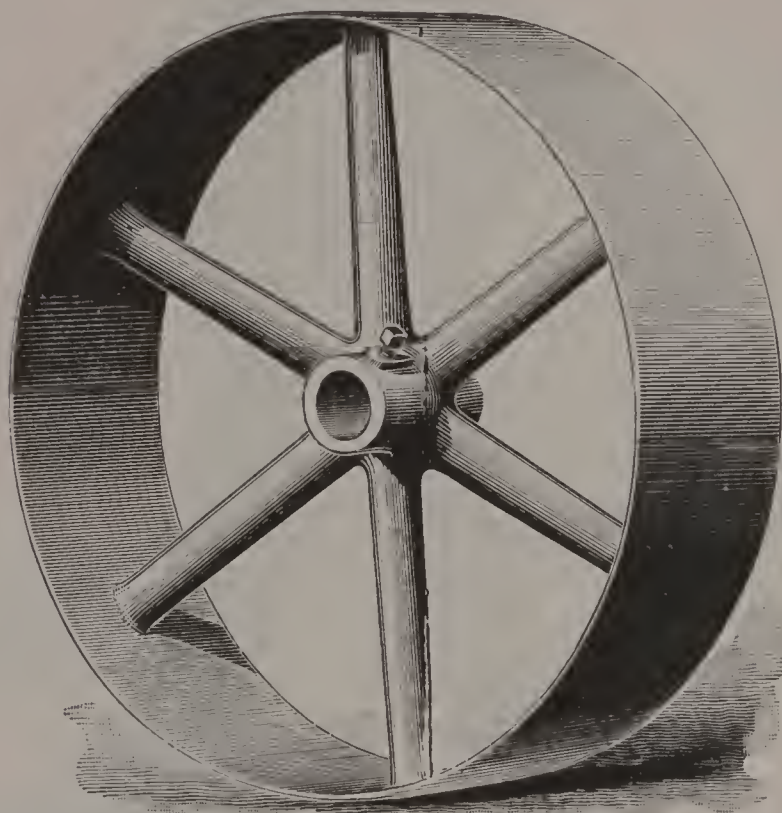


Figure 121.

Pulleys, 20" wide and over, with two sets of arms.

NOTE—When ordering Pulleys please specify whether they are to have CROWN-ING or STRAIGHT Face, and whether they are for SINGLE or DOUBLE Belt.

Also, please state whether to be KEY-SEATED or not.

STANDARD PRICE LIST SOLID IRON

PULLEYS.

MACHINE MOULDED.

Bored, Turned and Balanced, with Set Screws or Key Seats.

SOLID.									
Diam.	Face.	Single Belt.	Double Belt	Double Arm, Double Belt.	Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.
6	3	\$1.95	\$2.55	.....	8	7	\$3.20	\$4.35	.....
	4	2.10	2.80	.....		8	3.45	4.75	.....
	5	2.30	3.10	.....		9	.....	5.20	.....
	6	2.55	3.45	.....		10	.....	5.70	.....
	7	.....	3.80	.....		11	.....	6.15	.....
	8	.....	4.15	.....		12	.....	6.60	.....
	9	.....	4.50	.....		13	.....	7.15	.....
	10	.....	4.85	.....		14	.....	7.75	.....
	11	.....	5.25	.....	8½	3	2.35	3.05	.....
	12	.....	5.65	.....		4	2.55	3.35	.....
6½	3	2.05	2.65	.....		5	2.80	3.70	.....
	4	2.20	2.90	.....		6	3.05	4.10	.....
	5	2.40	3.25	.....		7	3.35	4.50	.....
	6	2.65	3.70	.....		8	3.65	4.95	.....
	7	.....	3.95	.....		9	3.95	5.40	.....
	8	.....	4.35	.....		10	.....	5.90	.....
	9	.....	4.70	.....		11	.....	6.40	.....
	10	.....	5.05	.....		12	.....	6.85	.....
	11	.....	5.50	.....		13	.....	7.40	.....
	12	.....	5.90	.....		14	.....	8.05	.....
7	3	2.10	2.75	.....	9	3	2.40	3.15	.....
	4	2.25	3.00	.....		4	2.60	3.45	.....
	5	2.50	3.35	.....		5	2.85	3.80	.....
	6	2.75	3.70	.....		6	3.15	4.25	.....
	7	.....	4.05	.....		7	3.45	4.65	.....
	8	.....	4.45	.....		8	3.75	5.10	.....
	9	.....	4.85	.....		9	4.10	5.60	.....
	10	.....	5.25	.....		10	.....	6.10	.....
	11	.....	5.70	.....		11	.....	6.60	.....
	12	.....	6.10	.....		12	.....	7.10	.....
7½	3	2.20	2.85	.....		13	.....	7.70	.....
	4	2.35	3.10	.....		14	.....	8.30	.....
	5	2.60	3.45	.....	9½	3	2.50	3.25	.....
	6	2.85	3.85	.....		4	2.70	3.60	.....
	7	3.10	4.20	.....		5	2.95	3.95	.....
	8	.....	4.60	.....		6	3.30	4.40	.....
	9	.....	5.05	.....		7	3.60	4.85	.....
	10	.....	5.50	.....		8	3.90	5.30	.....
	11	.....	5.95	.....		9	4.25	5.80	.....
	12	.....	6.35	.....		10	.....	6.30	.....
8	3	2.25	2.95	.....		11	.....	6.80	.....
	4	2.45	3.20	.....		12	.....	7.35	.....
	5	2.70	3.55	.....		13	.....	7.95	.....
	6	2.95	3.95	.....		14	.....	8.55	.....

SOLID IRON PULLEYS (Continued).

SOLID.									
Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.	Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.
10	3	\$2.55	\$3.35	.....	14	3	\$3.25	\$4.20	.....
	4	2.75	3.70	.....		4	3.55	4.70	.....
	5	3.05	4.10	.....		5	3.90	5.30	.....
	6	3.40	4.55	.....		6	4.35	5.95	.....
	7	3.70	5.00	.....		7	4.70	6.55	.....
	8	4.05	5.50	.....		8	5.20	7.20	.....
	9	4.40	6.00	.....		9	5.60	7.90	.....
	10	4.75	6.55	.....		10	6.10	8.60	.....
	11	.....	7.10	.....		11	6.55	9.30	.....
	12	.....	7.65	.....		12	.....	10.00	.....
	13	.....	8.25	.....		13	.....	10.80	.....
	14	.....	8.90	.....		14	.....	11.60	.....
11	3	2.70	3.55	.....	15	3	3.40	4.40	.....
	4	2.95	3.95	.....		4	3.75	5.00	.....
	5	3.25	4.40	.....		5	4.15	5.65	.....
	6	3.60	4.90	.....		6	4.60	6.30	.....
	7	3.95	5.40	.....		7	5.05	6.95	.....
	8	4.35	5.95	.....		8	5.50	7.65	.....
	9	4.65	6.45	.....		9	5.95	8.40	.....
	10	5.05	7.05	.....		10	6.45	9.15	.....
	11	.....	7.65	.....		11	6.95	9.90	.....
	12	.....	8.20	.....		12	7.50	10.70	.....
	13	.....	8.85	.....		13	.....	11.50	.....
	14	.....	9.50	.....		14	.....	12.35	.....
12	3	2.85	3.75	.....	16	3	3.60	4.70	.....
	4	3.15	4.20	.....		4	3.95	5.30	.....
	5	3.50	4.70	.....		5	4.40	6.00	.....
	6	3.85	5.25	.....		6	4.90	6.70	.....
	7	4.20	5.80	.....		7	5.35	7.45	.....
	8	4.55	6.35	.....		8	5.85	8.20	.....
	9	4.95	6.95	.....		9	6.30	9.00	.....
	10	5.35	7.55	.....		10	6.85	9.90	.....
	11	5.75	8.15	.....		11	7.40	10.60	.....
	12	.....	8.75	.....		12	8.00	11.45	.....
	13	.....	9.40	.....		14	.....	13.25	.....
	14	.....	10.10	.....		16	.....	15.15	.....
13	3	3.05	3.95	.....	17	3	3.80	5.00	.....
	4	3.35	4.45	.....		4	4.20	5.65	.....
	5	3.70	5.00	.....		5	4.70	6.40	.....
	6	4.10	5.60	.....		6	5.20	7.15	.....
	7	4.45	6.20	.....		7	5.70	7.90	.....
	8	4.90	6.80	.....		8	6.20	8.75	.....
	9	5.25	7.45	.....		9	6.75	9.60	.....
	10	5.70	8.10	.....		10	7.30	10.45	.....
	11	6.15	8.75	.....		11	7.90	11.30	.....
	12	.....	9.40	.....		12	8.50	12.25	.....
	13	.....	10.10	.....		14	.....	14.15	.....
	14	.....	10.85	.....		16	.....	16.15	.....

SOLID IRON PULLEYS (Continued).

SOLID.									
Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.	Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.
18	3	\$ 4.00	\$ 5.25	.....	21	11	\$ 10.20	\$ 15.85	.....
	4	4.45	5.95	.....		12	11.05	16.00	.....
	5	4.95	6.75	.....		14	13.20	18.55	.....
	6	5.50	7.60	.....		16	.....	21.10	.....
	7	6.05	8.45	.....		18	.....	23.90	.....
	8	6.60	9.30	.....		20	.....	26.65	.....
	9	7.15	10.20	.....	22	3	4.90	6.45	.....
	10	7.75	11.10	.....		4	5.55	7.40	.....
	11	8.40	12.05	.....		5	6.15	8.45	.....
	12	9.10	13.05	.....		6	6.90	9.60	.....
	14	.....	15.10	.....		7	7.65	10.80	.....
	16	.....	17.20	.....		8	8.40	12.00	.....
	18	.....	19.40	.....		9	9.15	13.20	.....
19	3	4.25	5.55	.....		10	9.95	14.50	.....
	4	4.70	6.30	.....		11	10.80	15.75	.....
	5	5.25	7.15	.....		12	11.70	17.00	.....
	6	5.85	8.10	.....		14	14.05	19.70	.....
	7	6.45	9.00	.....		16	.....	22.40	.....
	8	7.05	9.95	.....		18	.....	25.40	.....
	9	7.65	10.95	.....		20	.....	28.30	\$ 32.55
	10	8.30	11.95	.....		22	.....	.....	36.25
	11	9.00	12.95	.....		24	.....	.....	40.00
	12	9.75	14.00	.....		26	.....	.....	43.85
20	14	.....	16.25	.....	23	3	5.15	6.70	.....
	16	.....	18.50	.....		4	5.80	7.75	.....
	18	.....	20.90	.....		5	6.50	8.90	.....
	3	4.45	5.85	.....		6	7.25	10.10	.....
	4	4.95	6.65	.....		7	8.05	11.40	.....
	5	5.55	7.55	.....		8	8.85	12.70	.....
	6	6.20	8.60	.....		9	9.65	14.00	.....
	7	6.85	9.60	.....		10	10.50	15.35	.....
	8	7.50	10.60	.....		11	11.45	16.65	.....
	9	8.15	11.70	.....		12	12.40	18.00	.....
21	10	8.85	12.80	.....		14	14.85	20.85	.....
	11	9.60	13.90	.....		16	.....	23.75	.....
	12	10.40	15.00	.....		18	.....	26.90	.....
	14	12.40	17.40	.....		20	.....	29.95	34.45
	16	.....	19.80	.....		22	.....	.....	38.45
	18	.....	22.40	.....		24	.....	.....	42.45
	20	.....	25.00	.....		26	.....	.....	46.45
	3	4.70	6.15	.....	24	3	5.40	7.00	.....
	4	5.25	7.00	.....		4	6.10	8.15	.....
	5	5.85	8.00	.....		5	6.85	9.35	.....
	6	6.55	9.10	.....		6	7.65	10.65	.....
	7	7.25	10.20	.....		7	8.45	12.00	.....
	8	7.95	11.30	.....		8	9.30	13.40	.....
	9	8.65	12.45	.....		9	10.20	14.80	.....
	10	9.40	13.65	.....		10	11.10	16.20	.....

SOLID IRON PULLEYS (Continued).

SOLID.									
Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.	Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.
24	11	\$12.10	\$17.65	.....	27	3	\$ 6.35	\$ 8.25	.....
	12	13.15	19.00	.....		4	7.30	9.60	.....
	14	15.70	22.00	.....		5	8.15	11.00	.....
	16	.....	25.10	.....		6	9.05	12.50	.....
	18	.....	28.40	.....		7	10.00	14.10	.....
	20	.....	31.70	\$36.45		8	11.10	15.65	.....
	22	.....	.....	40.70		9	12.20	17.25	.....
	24	.....	.....	45.00		10	13.35	18.90	.....
	26	.....	.....	49.10		11	14.60	20.60	.....
	28	.....	.....	53.60		12	15.90	22.20	.....
	30	.....	.....	58.35		14	18.60	25.80	.....
25	3	5.70	7.40	.....		16	.....	29.60	.....
	4	6.50	8.65	.....		18	.....	33.55	.....
	5	7.25	9.90	.....		20	.....	37.50	\$43.10
	6	8.10	11.25	.....		22	.....	.....	47.95
	7	8.95	12.70	.....		24	.....	.....	52.55
	8	9.90	14.15	.....		26	.....	.....	57.35
	9	10.85	15.60	.....		28	.....	.....	62.10
	10	11.85	17.10	.....		30	.....	.....	67.20
	11	12.90	18.60	.....	28	3	6.75	8.70	.....
	12	14.05	20.05	.....		4	7.70	10.10	.....
	14	16.65	23.25	.....		5	8.50	11.55	.....
	16	.....	26.60	.....		6	9.50	13.15	.....
	18	.....	30.10	.....		7	10.60	14.80	.....
	20	.....	33.60	38.65		8	11.70	16.40	.....
	22	.....	.....	43.05		9	12.90	18.05	.....
	24	.....	.....	47.40		10	13.10	19.80	.....
	26	.....	.....	51.80		11	15.45	21.60	.....
	28	.....	.....	56.95		12	16.85	23.30	.....
	30	.....	.....	62.10		14	19.55	27.10	.....
26	3	6.00	7.80	.....		16	.....	31.10	.....
	4	6.90	9.15	.....		18	.....	35.25	.....
	5	7.65	10.45	.....		20	.....	39.45	45.35
	6	8.60	11.90	.....		22	.....	.....	50.30
	7	9.45	13.40	.....		24	.....	.....	55.10
	8	10.55	14.90	.....		26	.....	.....	60.00
	9	11.50	16.40	.....		28	.....	.....	65.00
	10	12.60	18.00	.....		30	.....	.....	70.05
	11	13.75	19.60	.....	29	3	7.25	9.15	.....
	12	15.00	21.10	.....		4	8.10	10.60	.....
	14	17.65	24.55	.....		5	9.00	12.15	.....
	16	.....	28.10	.....		6	10.00	13.85	.....
	18	.....	31.80	.....		7	11.15	15.50	.....
	20	.....	35.55	40.85		8	12.35	17.15	.....
	22	.....	.....	45.40		9	13.60	18.85	.....
	24	.....	.....	50.00		10	14.90	20.70	.....
	26	.....	.....	54.60		11	16.30	22.60	.....
	28	.....	.....	59.25		12	17.70	24.40	.....
	30	.....	.....	63.85		14	20.55	28.40	.....

SOLID IRON PULLEYS (Continued).

SOLID.									
Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.	Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.
29	16	.....	\$32.60	.....	32	6	\$11.65	\$16.05	.....
	18	.....	37.00	.....		7	12.95	17.90	.....
	20	.....	41.40	\$47.60		8	14.40	19.85	.....
	22	.....	.....	52.65		9	15.90	22.20	.....
	24	.....	.....	57.70		10	17.40	23.85	.....
	26	.....	.....	62.80		11	19.00	25.90	.....
	28	.....	.....	67.85		12	20.55	28.00	.....
	30	.....	.....	73.00		14	23.70	32.65	.....
30	3	\$7.60	9.60	.....		16	.....	37.45	.....
	4	8.55	11.10	.....		18	.....	42.30	.....
	5	9.45	12.70	.....		20	.....	47.15	\$54.50
	6	10.55	14.55	.....		22	.....	.....	59.80
	7	11.75	16.20	.....		24	.....	.....	65.35
	8	13.00	18.00	.....		26	.....	.....	70.90
	9	14.30	19.80	.....		28	.....	.....	76.75
	10	15.75	21.60	.....		30	.....	.....	82.40
	11	17.15	23.50	.....		32	.....	.....	88.15
	12	18.60	25.50	.....	33	3	8.90	11.00	.....
	14	21.55	29.70	.....		4	9.90	12.80	.....
	16	.....	34.20	.....		5	11.00	14.80	.....
	18	.....	38.70	.....		6	12.25	16.80	.....
	20	.....	43.25	49.75		7	13.60	18.80	.....
	22	.....	.....	54.95		8	15.05	20.80	.....
	24	.....	.....	60.25		9	16.70	22.85	.....
	26	.....	.....	65.45		10	18.25	24.95	.....
	28	.....	.....	70.70		11	19.90	27.10	.....
	30	.....	.....	76.00		12	21.50	29.25	.....
31	3	8.05	10.00	.....		14	24.80	34.10	.....
	4	8.95	11.65	.....		16	.....	39.05	.....
	5	9.85	13.40	.....		18	.....	44.10	.....
	6	11.10	15.30	.....		20	.....	49.15	56.95
	7	12.35	17.10	.....		22	.....	.....	62.30
	8	13.70	19.00	.....		24	.....	.....	67.90
	9	15.10	21.50	.....		26	.....	.....	73.70
	10	16.55	22.70	.....		28	.....	.....	79.60
	11	18.05	24.70	.....		30	.....	.....	85.60
	12	19.55	26.75	.....		32	.....	.....	91.75
	14	22.60	31.15	.....	34	3	9.40	11.60	.....
	16	.....	35.80	.....		4	10.40	13.50	.....
	18	.....	40.50	.....		5	11.50	15.50	.....
	20	.....	45.35	52.15		6	12.90	17.60	.....
	22	.....	.....	57.40		7	14.35	19.70	.....
	24	.....	.....	62.80		8	15.85	21.70	.....
	26	.....	.....	68.20		9	17.55	23.85	.....
	28	.....	.....	73.65		10	19.10	26.10	.....
	30	.....	.....	79.20		11	20.85	28.30	.....
32	3	8.45	10.45	.....		12	22.50	30.50	.....
	4	9.40	12.20	.....		14	25.90	35.60	.....
	5	10.45	14.10	.....		16	.....	40.70	.....

SOLID IRON PULLEYS (Continued).

SOLID.									
Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.	Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.
34	18	.....	\$45.90	.....	38	4	\$12.55	\$16.25	.....
	20	.....	51.65	\$59.40		5	13.95	18.65	.....
	22	.....	.....	64.60		6	15.60	21.05	.....
	24	.....	.....	70.50		7	17.95	23.45	.....
	26	.....	.....	76.45		8	20.25	25.90	.....
	28	.....	.....	82.55		9	22.55	28.35	.....
	30	.....	.....	88.70		10	24.85	30.80	.....
35	32	.....	.....	94.90		11	27.15	33.35	.....
	3	\$ 9.90	21.30	.....		12	29.45	35.95	.....
	4	10.90	14.10	.....		14	34.05	41.65	.....
	5	12.10	16.20	.....		16	.....	47.65	.....
	6	13.50	18.40	.....		18	.....	53.70	.....
	7	15.00	20.60	.....		20	.....	59.80	\$ 68.75
	8	16.60	22.75	.....		22	.....	65.90	74.80
	9	18.25	24.90	.....		24	.....	72.00	81.45
	10	19.95	27.20	.....		26	.....	.....	88.25
	11	21.75	29.50	.....		28	.....	.....	95.15
	12	23.50	31.80	.....		30	.....	.....	102.05
	14	27.00	37.05	.....		32	.....	.....	109.00
	16	.....	42.35	.....		34	.....	.....	115.95
	18	.....	47.70	.....		36	.....	.....	123.00
	20	.....	53.10	61.80	40	4	13.70	17.75	.....
	22	.....	.....	66.95		5	15.30	20.30	.....
	24	.....	.....	73.20		6	17.10	22.90	.....
	26	.....	.....	79.60		7	18.90	25.50	.....
	28	.....	.....	86.10		8	20.80	28.10	.....
	30	.....	.....	92.70		9	22.75	30.70	.....
	32	.....	.....	99.40		10	24.75	33.30	.....
36	3	10.40	12.75	.....		11	26.80	36.05	.....
	4	11.40	14.75	.....		12	28.80	38.75	.....
	5	12.65	16.95	.....		14	32.90	44.80	.....
	6	14.10	19.20	.....		16	.....	50.90	.....
	7	15.70	21.45	.....		18	.....	57.50	.....
	8	17.35	23.10	.....		20	.....	63.70	73.25
	9	19.10	26.00	.....		22	.....	69.70	80.15
	10	20.85	28.30	.....		24	.....	75.90	87.30
	11	22.70	30.70	.....		26	.....	.....	94.55
	12	24.50	33.10	.....		28	.....	.....	101.90
	14	28.10	38.55	.....		30	.....	.....	109.10
	16	.....	44.05	.....		32	.....	.....	116.60
	18	.....	49.55	.....		34	.....	.....	124.00
	20	.....	55.05	64.30		36	.....	.....	131.35
	22	.....	61.55	69.45		38	.....	.....	138.80
	24	.....	67.05	75.70		40	.....	.....	146.20
	26	.....	.....	82.00	42	4	14.90	19.30	.....
	28	.....	.....	88.45		5	16.70	22.05	.....
	30	.....	.....	94.95		6	18.60	24.80	.....
	32	.....	.....	101.55		7	20.55	27.55	.....
	34	.....	.....	108.25		8	22.55	30.30	.....
	36	.....	.....	115.00					

SOLID IRON PULLEYS (Continued).

SOLID.									
Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.	Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.
42	9	\$24.60	\$33.05	.....	46	12	\$35.80	\$48.20	.....
	10	26.70	35.85	.....		14	40.60	55.30	.....
	11	28.85	38.75	.....		16	.....	62.60	.....
	12	31.00	41.60	.....		18	.....	70.00	.....
	14	35.30	47.95	.....		20	.....	77.40	\$ 89.00
	16	.....	54.40	.....		22	.....	84.40	97.50
	18	.....	61.00	.....		24	.....	92.30	106.15
	20	.....	67.60	\$ 77.75		26	.....	.....	114.90
	22	.....	74.30	85.45		28	.....	.....	123.70
	24	.....	81.00	93.15		30	.....	.....	132.50
	26	.....	.....	100.85		32	.....	.....	141.45
	28	.....	.....	108.60		34	.....	.....	150.30
	30	.....	.....	116.40		36	.....	.....	159.15
	32	.....	.....	124.20		38	.....	.....	168.10
	34	.....	.....	132.00		40	.....	.....	177.00
44	4	16.25	21.00	.....	48	4	19.00	24.50	.....
	5	18.20	23.90	.....		5	21.20	27.70	.....
	6	20.25	26.85	.....		6	23.50	31.00	.....
	7	22.30	29.75	.....		7	25.85	34.30	.....
	8	24.45	32.70	.....		8	28.25	37.65	.....
	9	26.60	35.65	.....		9	30.65	41.05	.....
	10	28.80	38.65	.....		10	33.15	44.45	.....
	11	31.10	41.80	.....		11	35.70	48.00	.....
	12	33.40	44.90	.....		12	38.20	51.50	.....
	14	37.90	51.60	.....		14	43.30	59.00	.....
	16	.....	58.50	.....		16	.....	66.70	.....
	18	.....	65.50	.....		18	.....	74.50	.....
	20	.....	72.50	83.45		20	.....	82.30	94.65
	22	.....	79.50	91.40		22	.....	90.10	103.60
	24	.....	86.65	99.65		24	.....	98.00	112.70
46	26	.....	.....	107.85		26	.....	.....	121.90
	28	.....	.....	115.10	50	28	.....	.....	131.25
	30	.....	.....	124.45		30	.....	.....	140.65
	32	.....	.....	132.30		32	.....	.....	150.05
	34	.....	.....	141.10		34	.....	.....	159.50
	36	.....	.....	149.40		36	.....	.....	168.95
	38	.....	.....	157.80		38	.....	.....	178.35
	40	.....	.....	166.15		40	.....	.....	187.80
	4	17.65	22.75	.....		5	22.80	29.75	.....
	5	19.70	25.80	.....		6	25.30	33.30	.....
	6	21.85	28.90	.....		7	27.75	36.80	.....
	7	24.05	32.00	.....		8	30.25	40.30	.....
	8	26.35	35.15	.....		9	32.80	43.85	.....
	9	28.60	38.35	.....		10	35.45	47.45	.....
	10	30.95	41.55	.....		11	38.10	51.15	.....
	11	33.40	44.90	.....		12	40.80	54.80	.....
						14	46.20	62.70	.....
						16	52.00	70.85	.....
						18	.....	79.15	.....

SOLID IRON PULLEYS (Continued).

SOLID.									
Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.	Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.
50	20	.....	\$87.40	\$100.50	54	22	.....	\$107.00	\$123.05
	22	.....	95.70	110.50		24	.....	116.50	133.95
	24	.....	104.10	119.90		26	.....	126.00	144.90
	26	.....	.....	129.50		28	.....	.....	155.95
	28	.....	.....	139.45		30	.....	.....	167.10
	30	.....	.....	149.40		32	.....	.....	178.25
	32	.....	.....	159.35		34	.....	.....	189.40
	34	.....	.....	169.50		36	.....	.....	200.65
	36	.....	.....	179.50		38	.....	.....	211.95
	38	.....	.....	189.65		40	.....	.....	224.35
	40	.....	.....	199.85		42	.....	.....	237.50
	42	.....	.....	210.05		44	.....	.....	250.65
	44	.....	.....	220.25	56	6	\$30.85	40.65	.....
52	5	\$24.50	\$31.85	.....		7	33.55	44.50	.....
	6	27.10	35.65	.....		8	36.30	48.50	.....
	7	29.65	39.30	.....		9	39.25	52.55	.....
	8	32.30	43.00	.....		10	42.25	56.60	.....
	9	35.00	46.75	.....		11	45.45	60.75	.....
	10	37.75	50.50	.....		12	48.75	65.00	.....
	11	40.50	54.35	.....		14	55.40	74.35	.....
	12	43.40	58.15	.....		16	62.30	83.70	.....
	14	49.20	66.45	.....		18	.....	93.50	.....
	16	55.30	75.05	.....		20	.....	103.25	119.75
	18	.....	83.80	.....		22	.....	113.10	130.05
	20	.....	92.50	106.40		24	.....	123.15	141.60
	22	.....	101.30	116.50		26	.....	133.20	153.20
	24	.....	110.30	126.85		28	.....	.....	164.70
	26	.....	119.30	137.20		30	.....	.....	176.50
	28	.....	.....	147.65		32	.....	.....	188.25
	30	.....	.....	158.20		34	.....	.....	200.00
	32	.....	.....	168.80		36	.....	.....	212.00
	34	.....	.....	179.50		38	.....	.....	224.00
	36	.....	.....	190.10		40	.....	.....	236.00
	38	.....	.....	200.90	58	6	32.80	43.25	.....
54	40	.....	.....	211.70		7	35.50	47.20	.....
	42	.....	.....	222.50		8	38.35	51.30	.....
	44	.....	.....	233.30		9	41.35	55.45	.....
	5	26.20	33.95	.....		10	44.55	59.65	.....
	6	28.90	37.90	.....		11	47.95	64.00	.....
	7	31.65	41.80	.....		12	51.50	68.50	.....
	8	34.40	45.70	.....		14	58.60	78.45	.....
	9	37.20	49.65	.....		16	65.90	88.35	.....
	10	40.05	53.60	.....		18	.....	98.50	.....
	11	43.00	57.55	.....		20	.....	108.85	125.20
	12	46.00	61.50	.....		22	.....	119.25	137.15
	14	52.20	70.25	.....		24	.....	129.80	149.25
	16	58.70	79.25	.....		26	.....	140.40	161.45
	18	.....	88.50	.....					
	20	.....	97.70	112.35					

SOLID IRON PULLEYS (Continued).

SOLID.									
Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.	Diam.	Face.	Single Belt.	Double Belt.	Double Arm, Double Belt.
58	28	.....	.....	\$173.55	62	28	.....	.....	\$191.60
	30	.....	.....	185.95		30	.....	.....	205.40
	32	.....	.....	198.25		32	.....	.....	219.20
	34	.....	.....	210.35		34	.....	.....	233.00
	36	.....	.....	222.50		36	.....	.....	246.80
	38	.....	.....	234.95		38	.....	.....	260.60
	40	.....	.....	247.25		40	.....	.....	273.40
	42	.....	.....	259.60		42	.....	.....	287.20
	44	.....	.....	272.10		44	.....	.....	301.00
60	6	\$34.80	\$46.00	.....	64	46	.....	.....	314.80
	7	37.50	50.00	.....		48	.....	.....	328.60
	8	40.35	54.10	.....		50	.....	.....	342.40
	9	43.45	58.35	.....		6	\$38.60	\$50.60	.....
	10	46.85	62.75	.....		7	41.90	55.35	.....
	11	50.45	67.30	.....		8	45.35	60.10	.....
	12	54.20	72.00	.....		9	48.80	64.95	.....
	14	61.80	82.55	.....		10	52.75	69.90	.....
	16	69.60	92.55	.....		11	56.65	74.90	.....
	18	.....	103.50	.....		12	60.70	80.00	.....
	20	.....	114.45	131.60		14	69.10	91.35	.....
	22	.....	125.45	144.25		16	77.50	102.35	.....
	24	.....	136.50	157.00		18	.....	113.85	.....
	26	.....	147.65	169.80		20	.....	126.25	145.20
	28	.....	.....	182.60		22	.....	138.30	159.05
	30	.....	.....	195.40		24	.....	150.90	173.55
	32	.....	.....	208.20		26	.....	162.65	187.05
	34	.....	.....	221.00		28	.....	.....	201.15
	36	.....	.....	233.80		30	.....	.....	215.20
	38	.....	.....	246.60		32	.....	.....	228.25
	40	.....	.....	259.40		34	.....	.....	243.25
	42	.....	.....	272.25		36	.....	.....	257.35
	44	.....	.....	285.25		38	.....	.....	271.30
	46	.....	.....	298.35		40	.....	.....	285.30
	48	.....	.....	311.45		42	.....	.....	299.25
	50	.....	.....	324.55		44	.....	.....	313.20
62	6	36.70	48.30	.....	66	46	.....	.....	327.15
	7	39.80	52.65	.....		48	.....	.....	341.10
	8	42.85	57.10	.....		50	.....	.....	355.05
	9	45.95	61.65	.....		6	40.50	53.00	.....
	10	49.75	66.30	.....		7	44.20	58.05	.....
	11	53.55	71.10	.....		8	47.95	63.15	.....
	12	57.40	76.00	.....		9	51.80	68.30	.....
	14	65.40	86.60	.....		10	55.75	73.50	.....
	16	73.50	97.25	.....		11	59.80	78.75	.....
	18	.....	108.70	.....		12	64.00	84.00	.....
	20	.....	120.35	138.40		14	72.70	95.75	.....
	22	.....	131.85	150.60		16	81.50	107.55	.....
	24	.....	143.35	164.00		18	.....	119.50	.....
	26	.....	155.15	177.80		20	.....	132.15	152.05

FINISHED FLANGE PULLEYS.

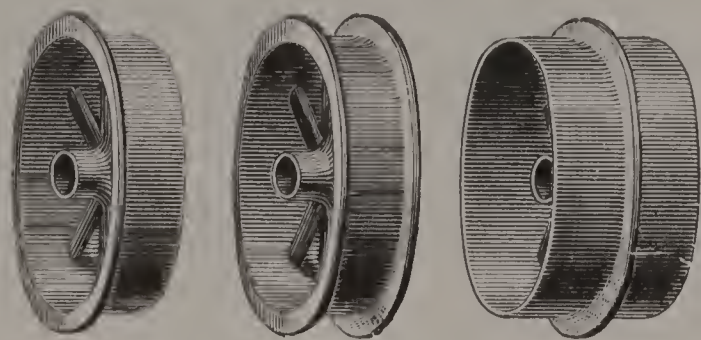


Figure 122.

EXTRAS TO BE ADDED TO THE LIST PRICES OF PULLEYS
HEREIN ENUMERATED.

	Up to 12½ in. Diam.	13 to 24 in. Diam.	25 to 36 in. Diam.	37 to 48 in. Diam.	49 to 84 in. Diam.	85 to 120 in. Diam.
	%	%	%	%	%	%
For Split Pulleys.....	60	50	40	30	25	20
“ Clamp Hub Pulleys	40	33	25	20	15	12½
“ Tight and Loose Pulleys.....	25	20	15	12½		
For Pulley with Flange in Centre	40	40	40	40		
“ “ “ “ one side..	60	60	60	60		
“ “ “ “ both “	100	100	100	100		

Key-Seating Shafts for Pulleys.

Size of Shaft.	WIDTH OF FACE OF PULLEY.					
	3 in. to 6 in.	7 in. to 9 in.	10 in. to 12 in.	13 in. to 16 in.	17 in. to 20 in.	21 in. to 24 in.
1¼ in. to 2 in	\$1.67	\$1.83	\$2.00			
2¼ “ “ 2½ “	1.67	1.83	2.00	\$2.50	\$2.67	
2⅝ “ “ 3 “	2.00	2.33	2.67	3.00	3.34	\$3.67
3⅞ “ “ 3½ “	2.50	2.67	2.83	3.17	3.50	3.83
3⅝ “ “ 4 “	2.67	2.83	3.00	3.34	3.67	4.00
4⅞ “ “ 4½ “	3.00	3.17	3.34	3.67	4.00	4.33
4¾ “ “ 5 “	3.34	3.50	3.67	4.00	4.33	4.67

SHEAVES OR GROOVED PULLEYS

FOR MANILLA OR HEMP ROPES.

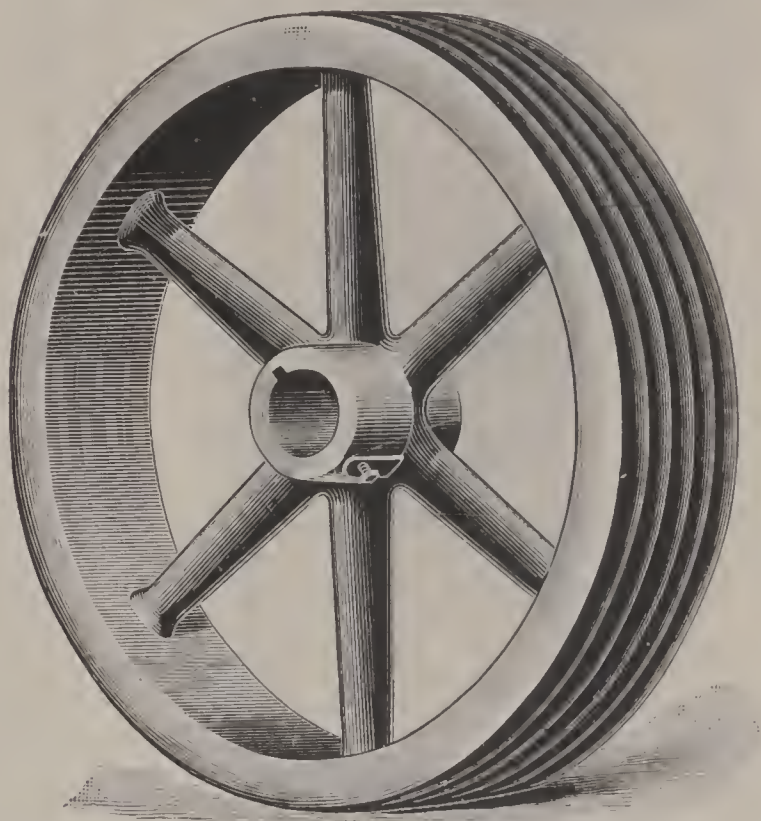


Figure 123.

We are prepared to furnish these sheaves from 3 feet to 30 feet pitch Diameter, with any number of Grooves required.

Prices given on application.

MULE PULLEY STAND.

ADJUSTABLE IN EVERY DIRECTION

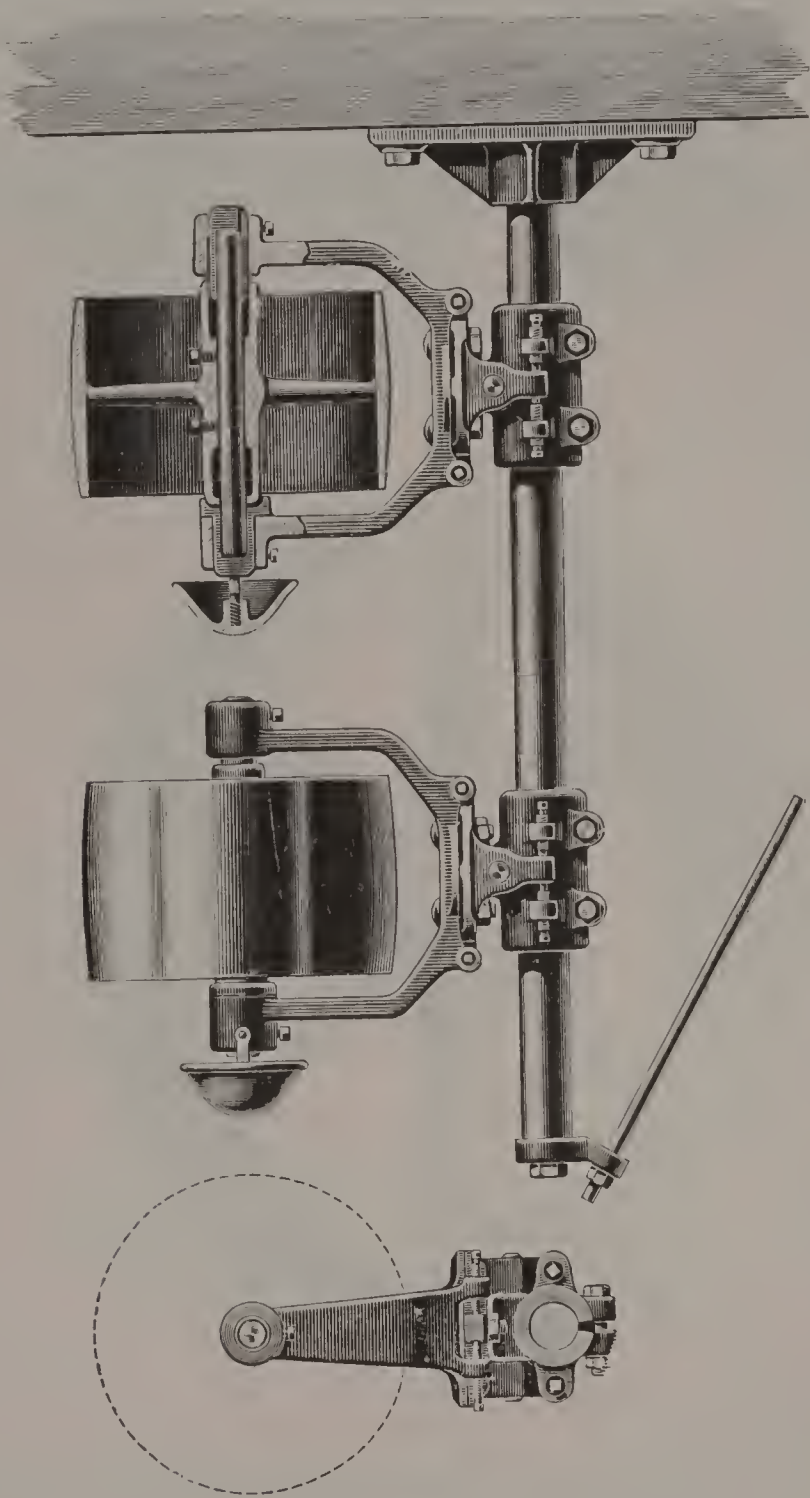


Figure 124.

The line shafts may be at any angle with each other, may not be in the same plane, the pulleys may differ much in diameter, and the belt may be crossed. Locate the stand so that its shaft will be about 10 times the width of the belt from the line shafts.

No.	Single Belt	Double Belt
1, For 3 to 5" Belt	\$ 48 00	\$ 60 00
2, For 6 to 8" Belt	63 00	80 00
3, For 9 to 12" Belt	117 00	146 00
4, For 13 to 15" Belt	140 00	175 00
5, For 16 to 19" Belt	227 00	284 00
6, For 20 to 24" Belt		452 00

BELT TIGHTENERS.

WITH RING-OILING BEARINGS

This style to be bolted to vertical posts or to horizontal beams.

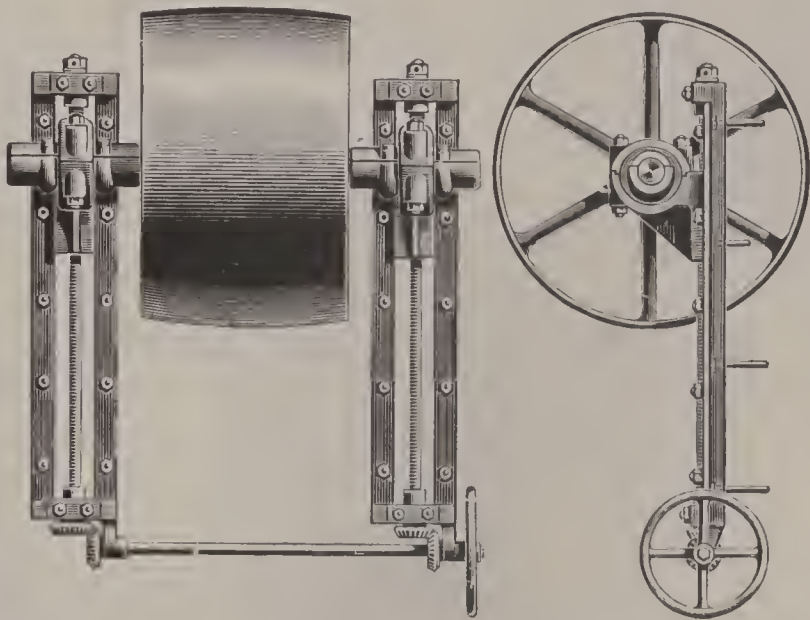


Figure 125.

TWO FEET RISE

This style suspended from beams.

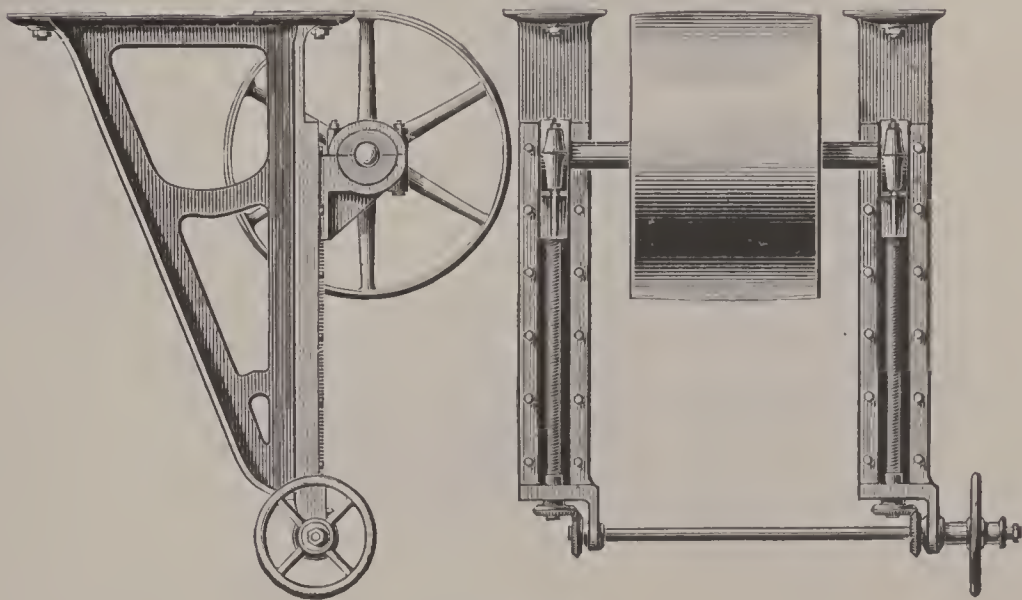


Figure 126.

Prices on application.

STANDARD SECTIONS.
STEEL BEAMS.

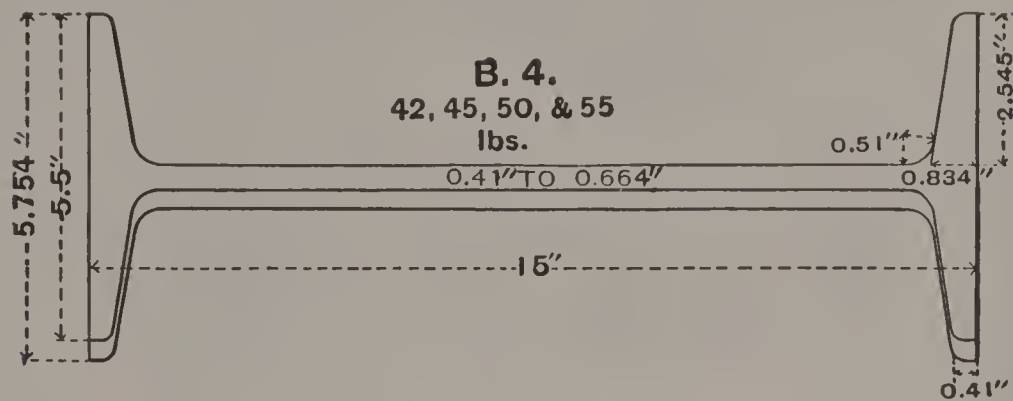


Figure 127.

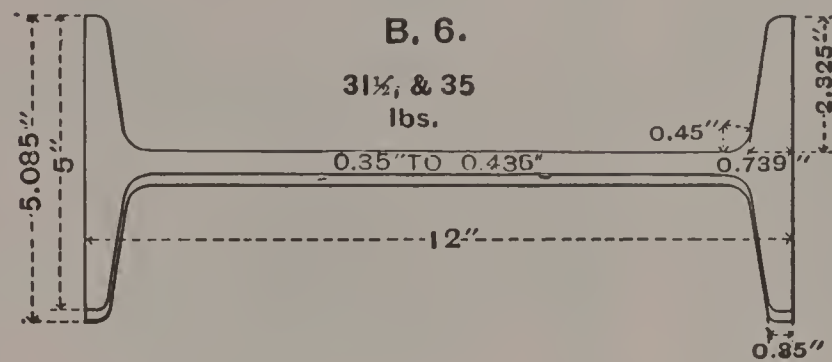


Figure 128.

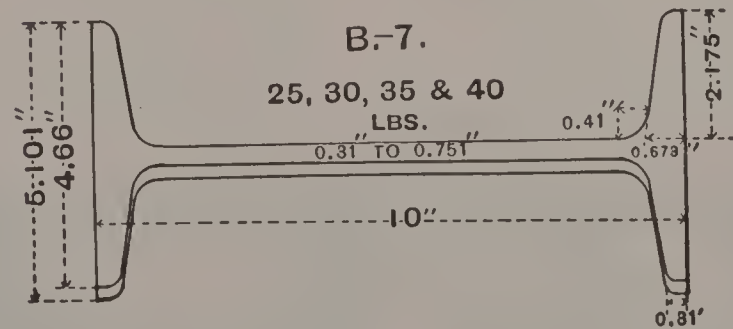


Figure 129.

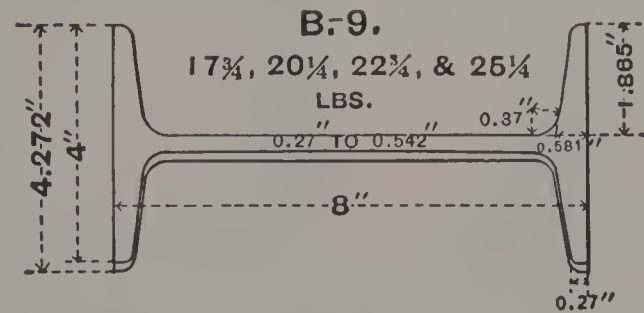


Figure 130.

Prices on application.

GEARING.

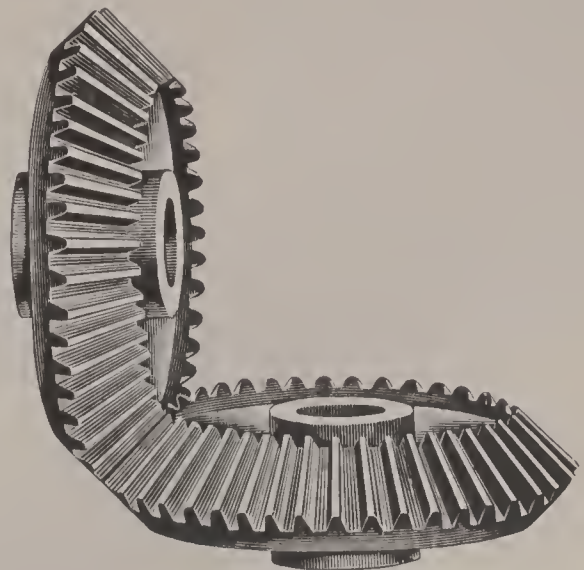


Figure 132.

We are prepared to furnish all
kinds and sizes of Gearing.
Prices quoted on application.

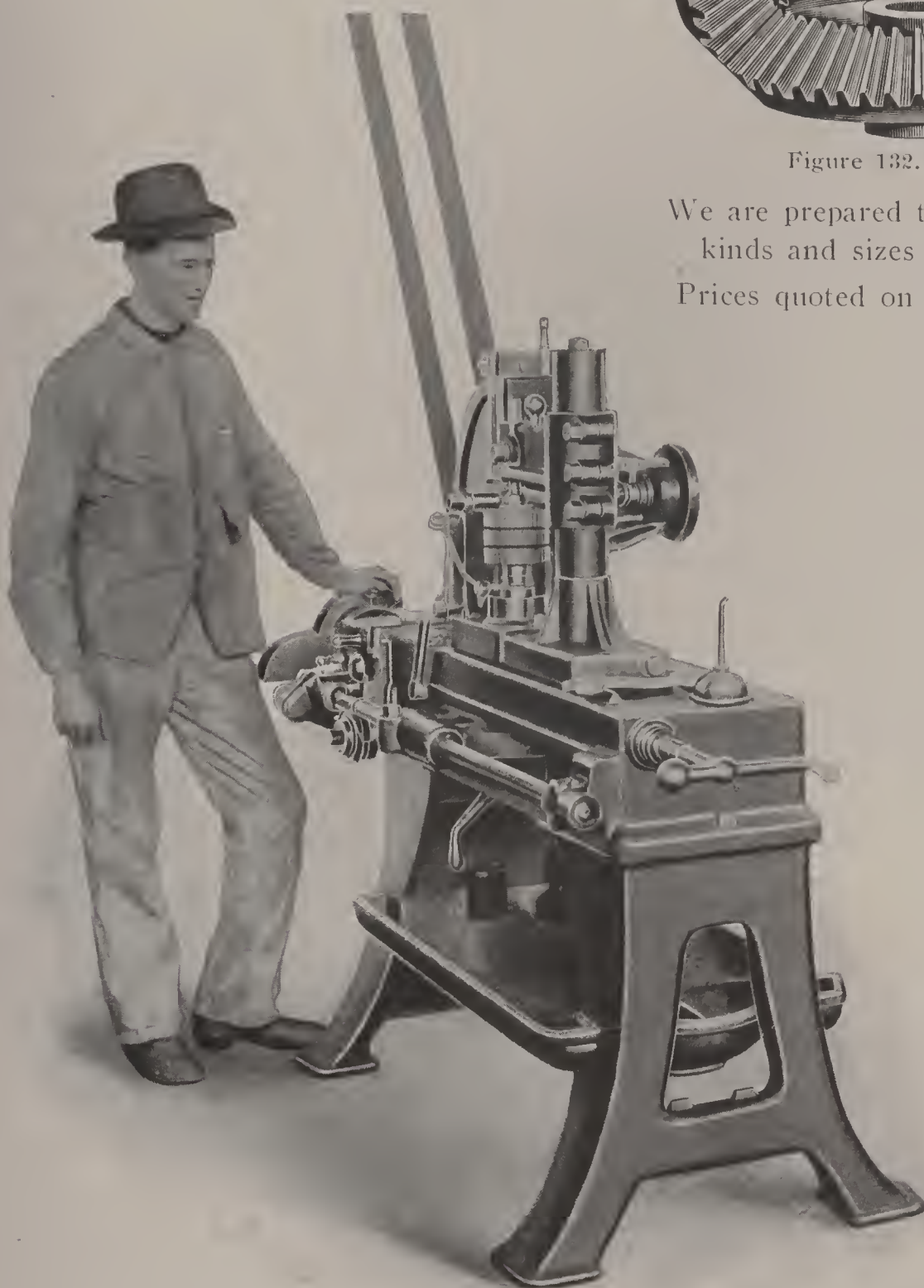


Figure 131.

Cutting Gears in our shop.

GEAR PITCH GAUGE.



Figure 133

A very useful tool for a machinist or mill superintendent.

(Made in our shops.)

Sent postpaid on receipt of \$2.00 each.

BELTING.
LEATHER BELTING

All discounts quoted apply to this Price List, Leather Belting Man's Association, Nov. 12, 1901, and which is in general use.

1/2 inch.....	\$0.10	14 inch.....	\$3.08	SOLID.	
5/8	0.12	15	3.30	1/8 inch.....	5 cts
3/4	0.14	16	3.52	3-16	7 cts
7/8	0.16	17	3.74	1/4	10 cts
1	0.17	18	3.96	5-16	14 cts
1 1/4	0.23	19	4.18	3/8	18 cts
1 1/2	0.29	20	4.40	TWIST.	
1 3/4	0.35	21	4.62	1/8	6 cts
2	0.41	22	4.84	3-16	10 cts
2 1/4	0.47	23	5.06	1/4	14 cts
2 1/2	0.53	24	5.28	5-16	18 cts
2 3/4	0.59	25	5.50	3/8	22 cts
3	0.64	26	5.72	1/2	30 cts
3 1/4	0.70	27	5.94	5/8	36 cts
3 1/2	0.76	28	6.16	3/4	46 cts
3 3/4	0.82	30	6.60	7/8	60 cts
4	0.87	32	7.04	1	72 cts
4 1/2	0.98	34	7.48	CUT LACING.	
5	1.09	36	7.92	Per Bundle of 100 Feet.	
5 1/2	1.21	38	8.36	1/4	\$1.00
6	1.32	40	8.80	5-16	1.25
6 1/2	1.43	44	9.68	3/8	1.50
7	1.54	48	10.56	1/2	2.00
8	1.76	52	11.44	5/8	2.75
9	1.98	56	12.32	3/4	3.25
10	2.20	60	13.20		
11	2.42	64	14.08		
12	2.64	68	14.96		
13	2.86	72	15.84		

The prices shown are for running feet of single belting in the widths stated; double belting is twice the price of single. Unlisted sizes take the price of the nearest higher listed size.

In orders for quarter turn belts, express mention should be made of such use; and in general it is advantageous to state for what purpose the belt is to be used.

RUBBER BELTING.

All discounts quoted apply to this Price List.

Inch.	2-Ply.	3-Ply.	4-Ply.	5-Ply.	6-Ply.	7-Ply.	8-Ply.	Inch.	2-Ply.	3-Ply.	4-Ply.	5-Ply.	6-Ply.	7-Ply.	8-Ply.
1	\$0.07	\$0.09	\$0.11					18	1.41	1.70	2.02	2.52	3.03	3.53	4.04
1 1/4	.09	.11	.13					20	1.58	1.90	2.26	2.82	3.39	3.95	4.52
1 1/2	.11	.13	.15	\$0.19				22	1.76	2.12	2.52	3.15	3.78	4.41	5.04
1 3/4	.13	.15	.17	.21				24	1.96	2.36	2.80	3.50	4.20	4.90	5.60
2	.15	.17	.21	.26	\$0.31			26	2.16	2.60	3.08	3.85	4.62	5.39	6.16
2 1/2	.18	.22	.26	.32	.39			28	2.36	2.84	3.36	4.20	5.04	5.88	6.72
3	.22	.26	.31	.38	.46			30	2.56	3.08	3.64	4.55	5.46	6.37	7.28
3 1/2	.26	.30	.37	.46	.55			32	2.76	3.32	3.92	4.90	5.88	6.86	7.84
4	.30	.34	.42	.52	.63	\$0.73		34	2.96	3.56	4.20	5.25	6.30	7.35	8.40
4 1/2	.33	.39	.47	.53	.70	.82		36	3.16	3.80	4.48	5.60	6.72	7.84	8.96
5	.36	.43	.52	.65	.78	.91		38	3.36	4.04	4.76	5.95	7.14	8.33	9.52
6	.43	.52	.62	.77	.93	1.08	\$1.24	40	3.56	4.28	5.04	6.30	7.56	8.82	10.08
7	.51	.60	.73	.91	1.09	1.27	1.46	42	3.76	4.52	5.32	6.65	7.98	9.31	10.64
8	.59	.70	.84	1.05	1.26	1.47	1.68	44	3.96	4.76	5.60	7.00	8.40	9.80	11.20
9	.67	.80	.95	1.18	1.42	1.66	1.90	46	4.16	5.00	5.88	7.35	8.82	10.29	11.76
10	.75	.90	1.07	1.33	1.60	1.87	2.14	48	4.36	5.24	6.16	7.70	9.24	10.78	12.32
11	.83	1.00	1.18	1.47	1.77	2.06	2.36	50	4.56	5.48	6.44	8.05	9.66	11.27	12.88
12	.91	1.08	1.30	1.62	1.95	2.27	2.60	52	4.76	5.72	6.72	8.40	10.08	11.76	13.44
13	1.00	1.18	1.42	1.77	2.13	2.48	2.84	54	4.96	5.96	7.00	8.75	10.50	12.25	14.00
14	1.08	1.28	1.54	1.92	2.31	2.69	3.08	56	5.16	6.20	7.28	9.10	10.92	12.74	14.56
15	1.16	1.38	1.66	2.07	2.49	2.90	3.32	58	5.36	6.44	7.56	9.45	11.34	13.23	15.12
16	1.25	1.50	1.78	2.22	2.67	3.11	3.56	60	5.56	6.68	7.84	9.80	11.76	13.72	15.68

All other widths and plies at proportionate prices.

SELF-LUBRICATING TRANSMISSION ROPE.



Figure 134.

It is self-lubricating; no external dressing needed.
Graphited core to prevent internal wear.
Outer yarns are "edged" to delay external wear.
Stretched in process of manufacture.
Selected long fibre Manila Hemp used throughout.

Our Men Splicing $1\frac{3}{4}$ Inch Rope at High Shoals Mill.



Figure 135.

The D. A. Tompkins Company

Charlotte, N. C.

MACHINE TOOLS
PIPE AND PIPE FITTINGS
VALVES
STEAM SPECIALTIES

Machinists' and Steam Fitters' Tools, etc.

We Make Contracts for
All Kinds of Pipe Work

Repair Work and Castings



Fig. 136

A Corner of our Roll Covering Departments.

We cover more rolls than any other concern in the country.

The business has been built up entirely on the quality of our work.

WE MAKE ROLLS.

WE COVER ROLLS.

WE MAKE COTS.

We reneck and reflute bottom rolls.

A trial order is solicited and prompt attention and satisfactory work guaranteed.

IMPROVED 20-INCH STANDARD ENGINE

LATHE.

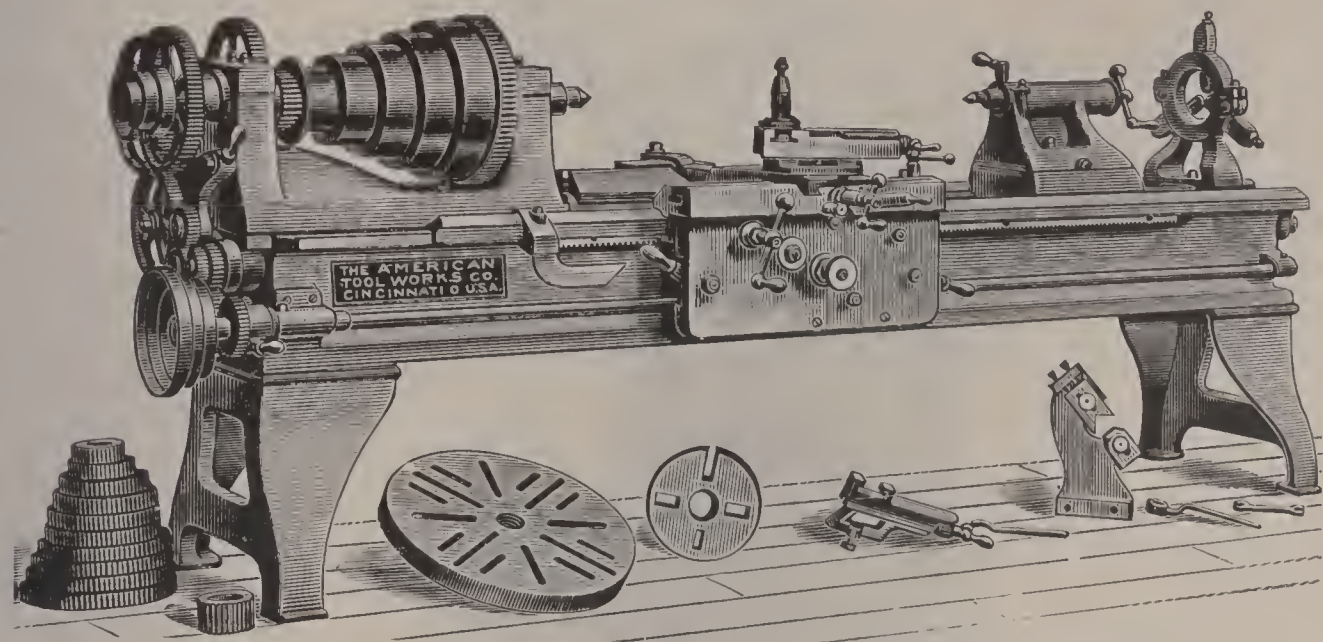


Figure 137.

PRICE LIST STANDARD ENGINE LATHES.

	LENGTH OF BED.					
	5 feet	6 feet	8 feet	10 feet	12 feet	14 feet
With Plain Rest.....						
12 inch Swing.....	\$215	\$225				
14 inch Swing		250	\$270	\$290		
16 inch Swing		315	335	355	\$375	
	10 feet	14 feet	18 feet	20 feet	24 feet	30 feet
With Compound Rest...						
20 inch Swing	\$510	\$565	\$620			
30 inch Swing	960	1070	1180	\$1235	\$1345	\$1510

Compound rest, taper attachments, extra length of bed and other different features extra, and prices quoted on application.

IMPROVED 20-INCH NATIONAL DRILL PRESS.

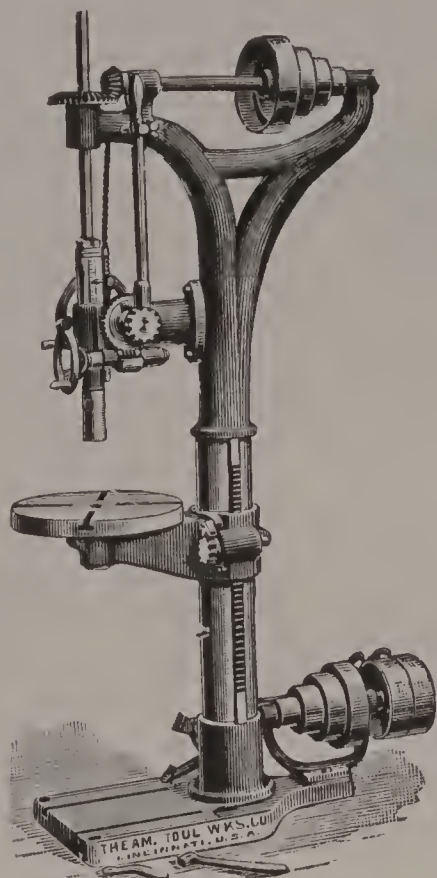


Figure 138.

With wheel and lever feed.

PRICE LIST NATIONAL DRILL PRESS.

SIZES.	20 inch	21 inch	22½ inch	25 inch
Price with wheel and lever feed.....	\$ 65	\$80		
Price with power feed.....	80	97		
Price with back gears.....		97		
Price with back gear and power feed.....		110	\$135	\$155
Extra for friction rev. pulleys.....	17	17	21	21
Extra for arranging in gang, each.....	13	13	13	17

IMPROVED 32, 36 AND 42-INCH STANDARD
DRILL PRESSES.

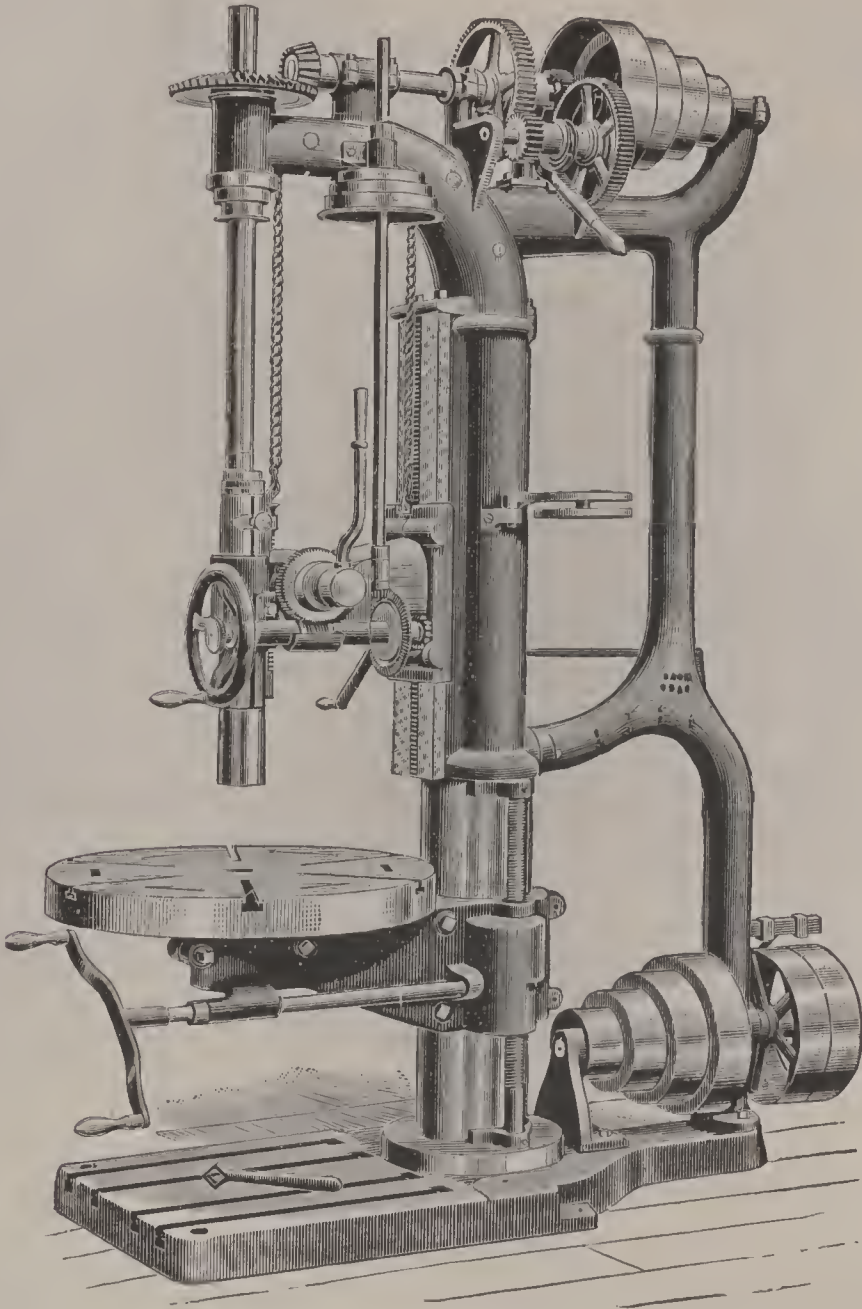


Figure 139.

PRICE LIST STANDARD DRILL PRESS.

SIZES.....	25 inch.	28 inch.	32 inch	36 inch.	42 inch.
Price.....	\$187	\$242	\$310	\$365	\$390
Extra for Compound Table.....	125	125	125	165	165
Extra for friction reversing Pulleys	21	21	25	25	30

IMPROVED 36-INCH IRON PLANER.

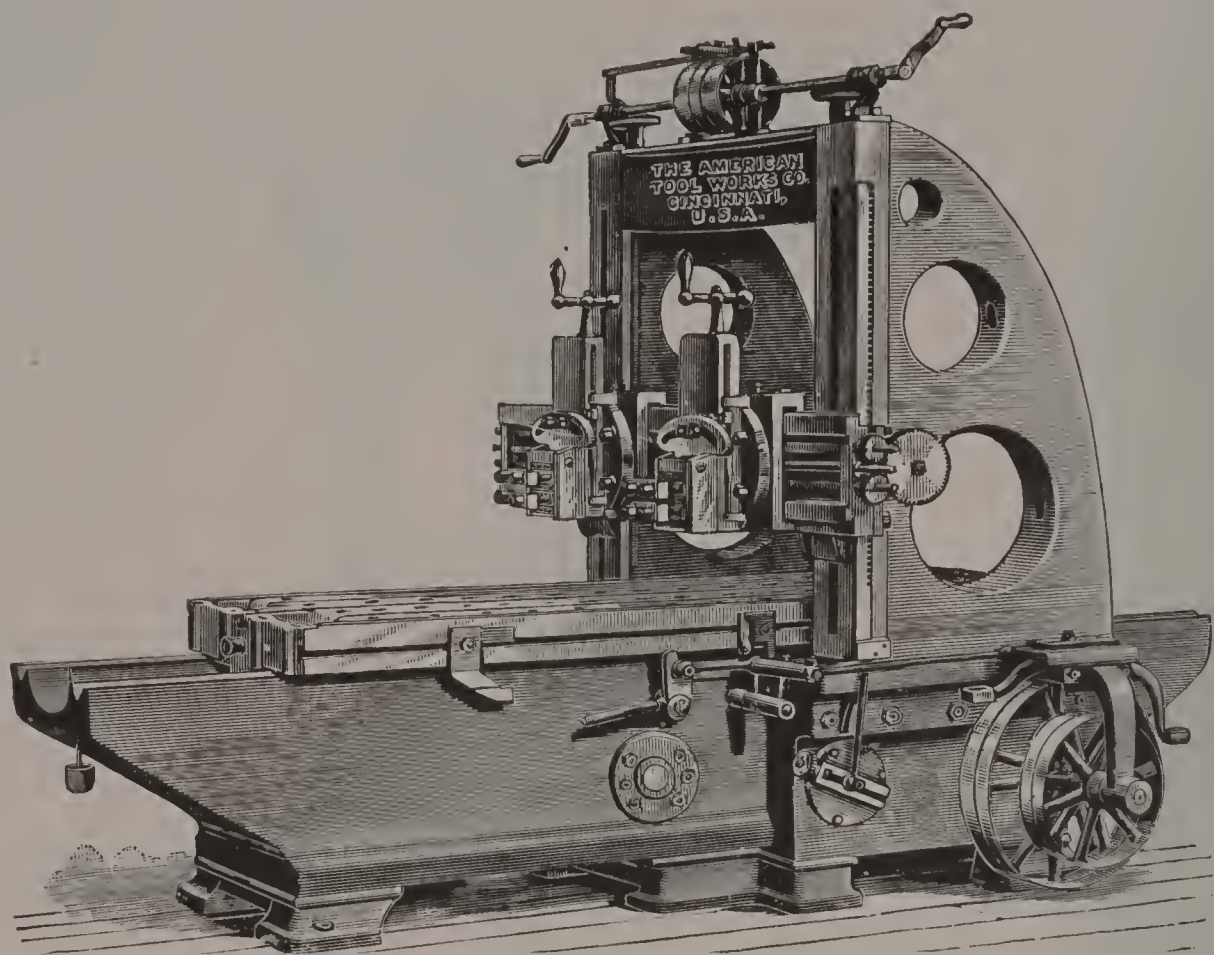


Figure 140.

PRICE LIST IRON PLANERS.

WITH SINGLE HEAD.		LENGTH OF TABLE.					
Planes Wide	Planes High.	5 feet	6 feet	8 feet	10 feet	12 feet	18 feet
22 inches	22¾ inches	\$ 475	\$ 500				
24 inches	25 inches		580	\$ 640	\$ 700	\$ 765	
30 inches	33 inches			915	1010	1100	
36 inches	36½ inches			1130	1250	1375	\$ 1745

For extra head on rail, right angle drive, etc., extra price quoted on application.

IMPROVED HAND GEAR-CUTTING MACHINE.

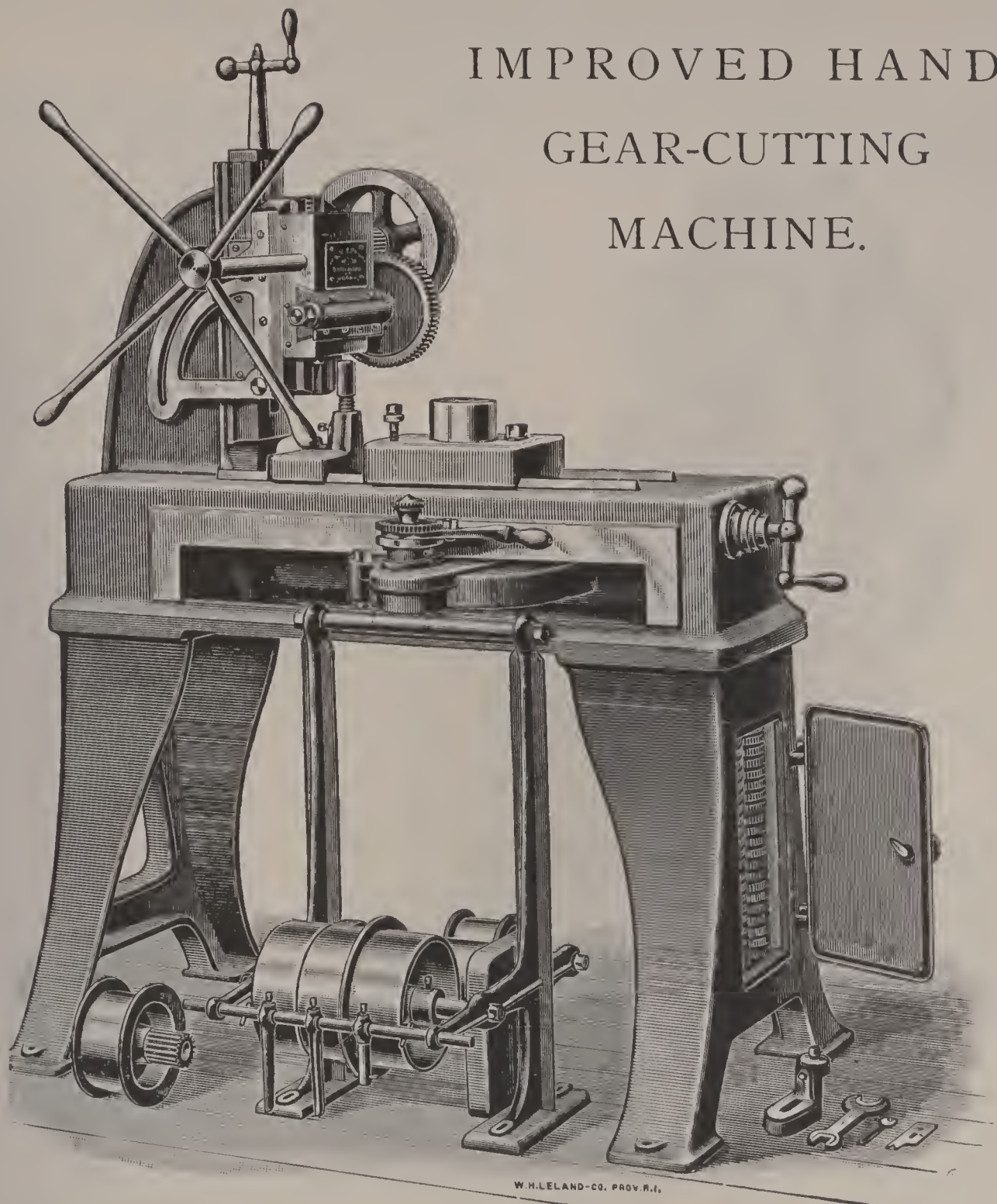


Figure 141.

Will cut 30" diameter by $6\frac{3}{4}$ " face, to 6 diametral pitch.

GENERAL DESCRIPTION.

This machine is simple, strong and compact, and is designed for use in general machine and repair shops. It is especially adapted to the requirements of repair shops connected with textile factories. It is very conveniently adjusted and operated upon all classes of gear cutting within its capacity.

It will cut spur, bevel and worm wheels to 30 inches diameter by 6-inch face, of 6 diametrical pitch and finer, in steel, iron, brass or wood. It is especially effective on all sizes under 15 inches.

It will cut every number to 100, every even number to 186, and has a wide range of higher numbers.

It may be accurately set at any desired angle for bevel gears by a properly graduated arc, and has a graduated adjustment either side of the vertical, so that it may be conveniently set for cutting wheels to be operated by worms; also for trimming the sides of bevel gear teeth when set over at any angle. The cutter may be adjusted to the centre or $\frac{1}{2}$ inch either side, if desired. The cutter is fed through the blank by hand, as shown.

The machine occupies a floor space of 24x48 inches, and weighs, when ready for shipment, 1,000 pounds. It is furnished with all necessary change wheels, tables of division, wrenches, etc., and an adjustable rim rest, for use when cutting gears of large diameter.

The countershaft has tight and loose pulleys, 7 inches in diameter, $2\frac{3}{4}$ -inch face, and should make 275 revolutions. Price on application.

PATENT CUTTERS.

FOR THE TEETH OF GEAR WHEELS, WHICH CAN BE SHARP-
ENED BY GRINDING WITHOUT CHANGING THEIR FORM.

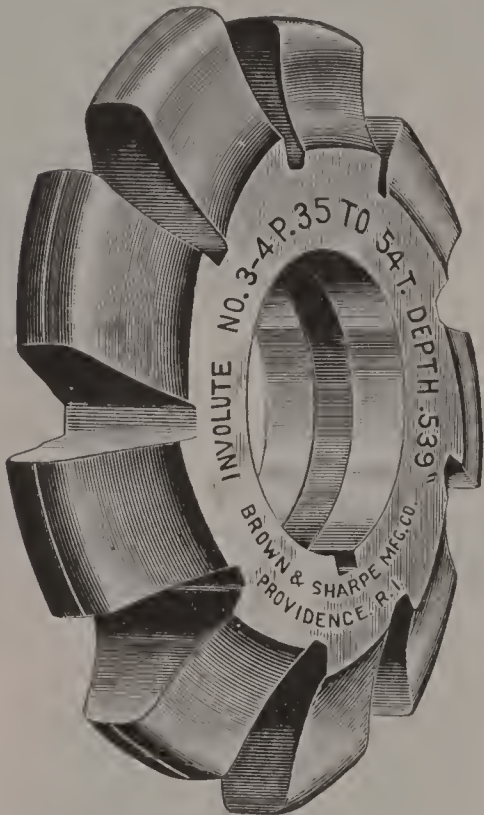


Figure 142.

The patent cutters for the teeth of gear wheels, from their peculiar construction, can be sharpened when dull by grinding the faces of the teeth. This operation can be repeated without altering the form of the tooth which the cutter makes, thereby rendering them many times more valuable than cutters of ordinary form.

The larger sizes and cutters for worm wheels can be made to order at short notice. Orders should be given by annexed tables, stating the number of cutter and the diametral pitch required. By diametral pitch is meant the number of teeth to the inch in diameter on pitch circle of any wheel. In ordering cutters for worm wheels, give the number of teeth in wheel, the diameter of worm and number of threads to the inch.

Directions for Using the Cutters.—

The cutters should be kept perfectly sharp by grinding the face of the teeth on the side of a solid emery or vulcanite wheel, which has its edge beveled on one side so as to reach to the bottom of the teeth. This wheel should be put on an arbor with a shoulder and nut, so that the flat side will run true, and at a velocity of from 2,000 to 3,000 revolutions per minute. If used in a common hand lathe the top of the rest should be made square or vertical to the face of the wheel, or what is better, use a small platform in the place of the rest. Then by laying the cutter on the rest or platform, the face of the teeth can be ground square, which is very important. The cutters should not be crowded too hard, especially when cutting through at the end of the tooth. The depth of the space made by these cutters affords ample clearance, as it exceeds the working depth of the tooth by an amount equal to one-tenth of the thickness of the tooth on the pitch line.

PATENT INVOLUTE CUTTERS.—FOR TEETH OF GEAR WHEELS.

Eight cutters are made for each pitch, as follows :

- No. 1 will cut wheels from 135 teeth to a rack.
No. 2 will cut wheels from 55 teeth to 134 teeth.
No. 3 will cut wheels from 35 teeth to 54 teeth.
No. 4 will cut wheels from 26 to 34 teeth.

No. 5 will cut wheels from 21 teeth to 25 teeth.
No. 6 will cut wheels from 17 teeth to 20 teeth.
No. 7 will cut wheels from 14 teeth to 16 teeth.
No. 8 will cut wheels from 12 teeth to 13 teeth.

In ordering give the number of cutter and diametral pitch required.

CUTTERS FOR MITRE AND BEVEL GEARS.

Diametral pitch	Price of Each Cutter.	Diameter of Cutter.	Hole in Cutter	Dimetral Pitch.	Price of Each Cutter.	Diameter of Cutter.	Hole in Cutter.
4	\$ 5 50	3 3⁄8 in.	1 1⁄4 in.	12	\$ 2 65	2 in.	7⁄8 in.
5	4 40	3 1⁄6 "	"	14	2 55	2 "	"
6	3 90	2 3⁄4 "	1 1⁄6 "	16	2 45	1 1⁄6 "	"
8	3 40	2 1⁄2 "	"	20	2 30	1 7⁄8 "	"
10	3 00	2 1⁄8 "	7⁄8 "	24	2 10	1 3⁄4 "	"

Cutters for pitches not given in the above list will be made to order.

SPECIAL GEAR CUTTERS.

Worm Wheel Cutters and cutters of special dimensions are made to order at special prices. Spur and Bevel Gear Cutters, shown in lists, when ordered with special size hole, are made to order at an advance of fifty cents each on list.

PATENT INVOLUTE CUTTERS.

FOR TEETH OF GEAR WHEELS.

All Gears of same Pitch cut with these Cutters
are interchangeable.

Diametral Pitch.	Price of Each Cutter.	Diameter of Cutter.	Hole in Cutter.
*2	\$12 50	5 ''	1¼''
*2¼	11 25	4½	..
*2½	10 00	4¼	..
*2¾	9 00	4	..
3	7 00	3½	..
*3¼	6 50	3¼	..
*3½	6 25	3⅜	..
*3¾	6 00	3½	..
4	5 50	3⅝	..
*4½	5 00	3¾	..
5	4 50	3⅞	..
*5½	4 20	3	..
6	3 90	2¾	1⅛
7	3 60	2⅞	..
8	3 40	2½	..
9	3 20	2⅜	..
10	3 00	2⅝	7⁄8
11	2 75	2⅞	..
12	2 65	2	..
*13	2 60	2	..
14	2 55	2	..
*15	2 50	2	..
16	2 45	1½	..
18	2 35	1⅝	..
20	2 30	1⅞	..
22	2 20	1⅝	..
24	2 10	1¾	..
26	1 95	..	..
28	1 80	..	..
30	1 80	..	..
32	1 80	..	..
36	1 80	..	..
*38	1 80	..	..
40	1 80	..	..
*44	1 80	..	..
48	1 80	..	..
*50	1 80	..	..
*56	1 80	..	..
*60	1 80	..	..
*64	1 80	..	..
*70	1 80	..	..
*80	1 80	..	..
*120	1 80	..	..

FOR USE ON NO. 3 AUTOMATIC
GEAR CUTTING MACHINE.

Design of 1896.

Diametral Pitch.	Price	Diameter of Cutter.	Hole in Cutter.
*4	\$5 50	3½''	1''
*4½	5 00	3⅝	..
5	4 50	3¼	..
*5½	4 20	3⅜	..
6	3 90	3	..
7	3 60	2⅞	..
8	3 40	2⅞	..
9	3 20	2¾	..
10	3 00	2¾	..
11	2 75	2⅞	..
12	2 65	2⅞	..
*13	2 60	2⅞	..
14	2 55	2½	..
*15	2 50	2½	..
16	2 45	2½	..
18	2 35	2⅝	..
20	2 30	2⅝	..
22	2 20	2¼	..
24	2 10	2¼	..
*26	2 00	2¼	..
*28	2 00	2¼	..
*30	2 00	2¼	..
*32	2 00	2¼	..
*36	2 00	2¼	..
*40	2 00	2¼	..
*48	2 00	2¼	..

FOR USE ON NO. 4 AUTOMATIC
GEAR CUTTING MACHINE.

Design of 1896.			
Diametral Pitch.	Price.	Diameter of Cutter.	Hole in Cutter.
*3	\$7 50	4¼''	1¼''
*3½	6 75	4	..
4	6 00	3¾	..
*4½	5 50	3¾	..
5	5 25	3⅝	..
*5½	5 00	3⅝	..
6	4 75	3½	..
7	4 50	3⅝	..
8	4 25	3¼	..
9	4 00	3⅝	..
10	3 75	3	..
11	3 50	2⅞	..
12	3 25	2⅞	..
*14	3 00	2⅞	..
*16	3 00	2⅞	..
*18	3 00	2⅞	..
*20	3 00	2¾	..

FOR NO. 5 AUTOMATIC GEAR
CUTTING MACHINE.

Design of 1896.			
Diametral Pitch.	Price.	Diameter of Cutter.	Hole in Cutter.
*2	\$13 50	5¾''	1½''
*2¼	12 25	5½	..
*2½	10 50	5	..
*2¾	9 50	4¾	..
3	8 00	4¾	..
*3¼	7 75	4½	..
*3½	7 25	4⅝	..
*3¾	6 75	4¼	..
4	6 25	4¼	..
*4½	5 75	4⅛	..
5	5 25	4	..
*5½	5 00	3⅞	..
6	4 75	3¾	..
7	4 50	3⅝	..
8	4 25	3½	..
*9	4 00	3½	..
*10	3 75	3½	..

FOR USE ON NO. 6 AUTOMATIC
GEAR CUTTING MACHINE.

Design of 1896.			
Diametral Pitch.	Price.	Diameter of Cutter.	Hole in Cutter.
*1¾	\$18 50	6½''	1¾''
2	14 00	6¼	..
*2¼	12 75	6	..
2½	11 00	5¾	..
*2¾	10 00	5½	..
3	8 50	5¼	..
*3¼	8 25	5⅛	..
*3½	7 75	4⅞	..
*3¾	7 25	4¾	..
4	6 75	4⅝	..
*4½	6 25	4½	..
5	5 75	4⅜	..
*5½	5 75	4⅜	..
6	5 50	4¼	..
*7	5 25	4⅛	..
*8	5 00	4	..

Cutters marked * made to order.

KEYSEATERS.

It often pays to take the Machine to the work.

It saves time ; it saves room ; it often saves lots of money.

Weighs, boxed, 100 pounds.

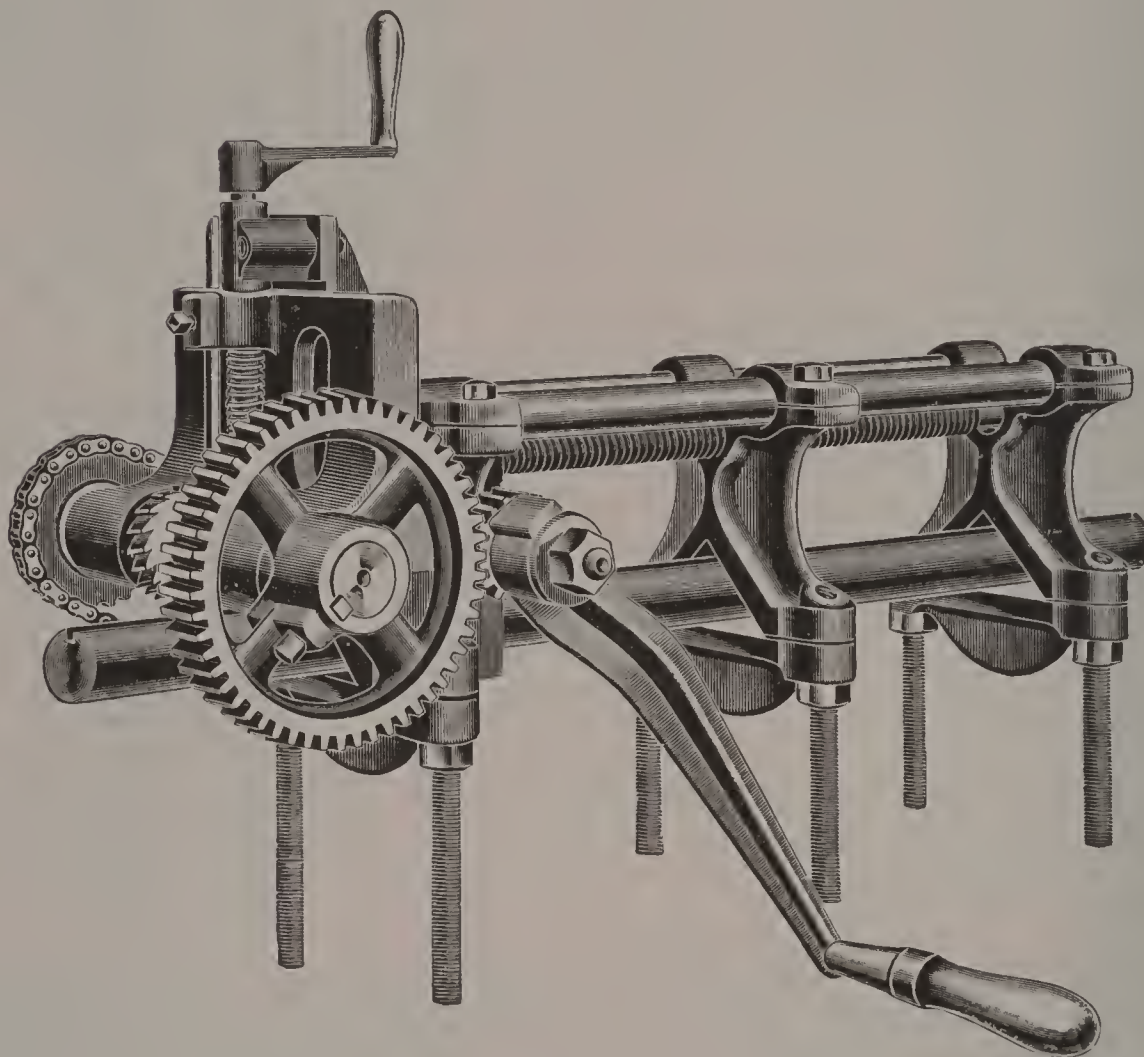


Figure 143.

Portable Shaft Keyseater.

Mills Keyseats in Shafting in position up to 5-inch diameter.

Mills Keyseats up to $1\frac{1}{8} \times 5\frac{1}{8}$ -inch. Full width at one cut.

Support directly under cutter at all times.

Mills Keyseats without Chatters.

Mills Keyseats with true sides and smooth bottoms.

Self-centering and automatic feed.

Machine has five cutters by which Keyseats from $\frac{1}{4}$ inch to $1\frac{1}{8}$ inch wide, varying 1-16 inch, may be cut full width at one operation.

Price complete, \$40.00.

“THE MORSE” VALVE RESEATING MACHINES.

Are indispensable money-saving outfits for repairing all flat and taper-seated valves and faucets from ¼ to 18 inches, without disconnecting them from the pipes. Old valves that have been laid aside can be made as good as new eight or ten times. Highly recommended by several thousand users, including the United States and European Navies and War Departments, Railroad, Steamship, Electric Light, Gas, Power and Manufacturing Companies, Public Institutions, Breweries, Iron, Steel and Mining Industries.

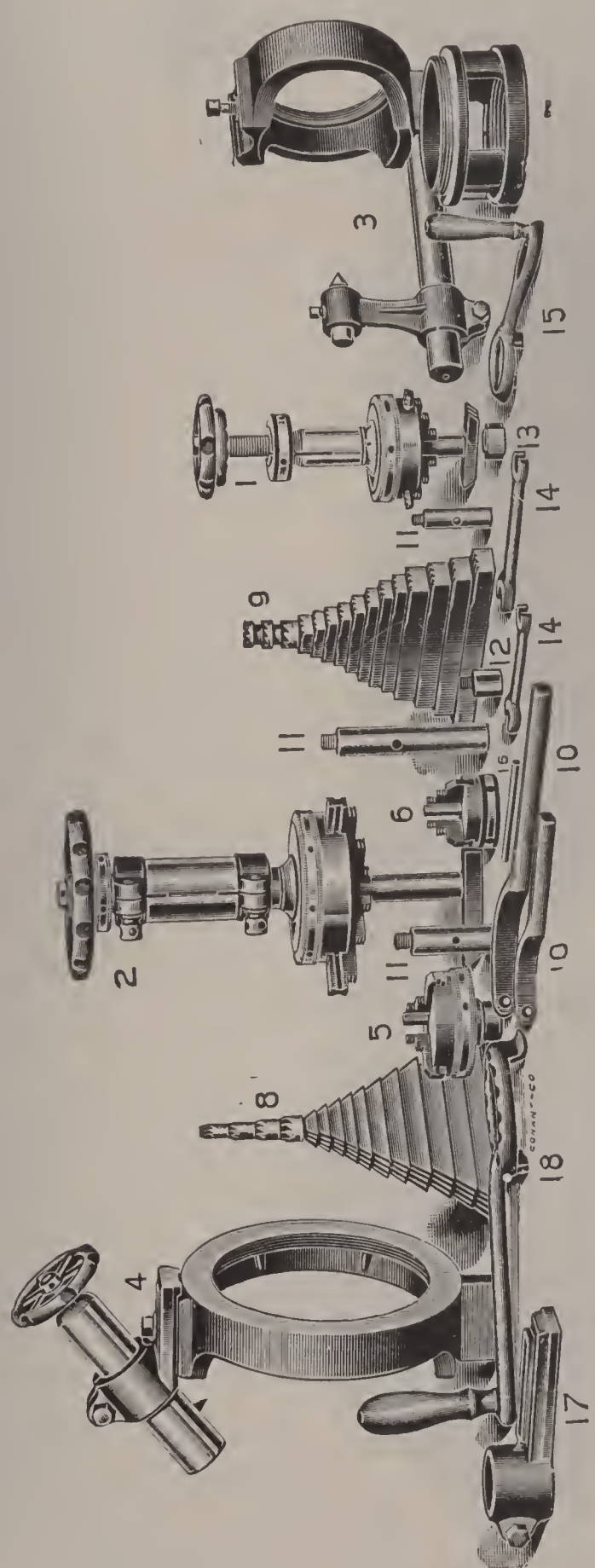


Figure 144.

No. 3—For reseating all flat and taper-seated valves from ¼ to 3 inches	\$ 75 00
No. 4—For reseating all flat and taper-seated valves from ¼ to 4 inches, also faucets	90 00
No. 6—For reseating all flat and taper-seated valves from ¼ to 6 inches	125 00
No. 9A—For reseating all flat and taper-seated valves from 3 to 9 inches, inclusive . .	135 00
No. 9—For reseating all flat and taper-seated valves from ¼ to 9 inches, with Dexter Patent Disc Cutter.....	175 00
No. 12—For reseating all flat and taper-seated valves from 4 to 12 inches inclusive, with Disc Cutter.....	250 00
New No. 12—For reseating all flat and taper-seated valves and recutting the discs, from 4 to 12 inches.....	250 00
New No. 12—Machine for recutting valves and discs, ¼ to 12 inches in combination with No. 4 machine.....	325 00

“ TOMPKINS ” EMERY GRINDING MACHINES.



Figure 145.
Made in our shop.
Price.....each \$35.00

EMERY WHEELS.

TABLE OF EMERY WHEEL SPEEDS.

Diameter Wheel	Revolutions per Minute for Surface Speed of 4,000 feet.	Revolutions per Minute for Surface Speed of 5,000 feet.	Revolutions per Minute for Surface Speed of 6,000 feet.
1 inch.	15,279	19,099	22,918
2 "	7,639	9,549	11,459
3 "	5,093	6,366	7,639
4 "	3,820	4,775	5,730
5 "	3,056	3,820	4,584
6 "	2,546	3,183	3,820
7 "	2,183	2,728	3,274
8 "	1,910	2,387	2,865
10 "	1,528	1,910	2,292
12 "	1,273	1,592	1,910
14 "	1,091	1,364	1,637
16 "	955	1,194	1,432
18 "	849	1,061	1,273
20 "	764	955	1,146
22 "	694	868	1,042
24 "	637	796	955
30 "	509	637	764
36 "	424	531	637

Above table designates number of revolutions per minute for specified diameters of wheels, to cause them to run at the respective periphery rates of 4,000, 5,000 and 6,000 feet per minute.

The medium of 5,000 feet is usually employed in ordinary work, but in special cases it is sometimes desirable to run them at a lower or higher rate according to requirements.

The stress on the wheel at 4,000 feet periphery speed per minute is 48 pounds per square inch. At 5,000 feet, 75 pounds. At 6,000 feet, 108 pounds.

Wheels are tested immediately before shipment at not less than 9,000 feet per minute, giving them a stress of 250 pounds or more per square inch, thus proving beyond any question that each and every wheel is entirely free from defects or weakness before it is sent out; nevertheless it is recommended that they be run in actual use as moderately as practicable, so that an ample margin of safety may be allowed.

PRICE LIST OF REGULAR WHEELS.

Diameter in Inches.	Thickness of Wheels in Inches.								
	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
1	\$ 25	\$ 30	\$ 30	\$ 35	\$ 35	\$ 40	\$ 40	\$ 45	\$ 50
1½	30	35	40	45	45	50	50	55	60
2	35	45	50	55	55	60	60	65	70
2½	40	55	65	70	75	80	85	95	1 05
3	50	65	80	90	95	1 05	1 10	1 25	1 40
3½	60	80	95	1 05	1 15	1 25	1 35	1 55	1 75
4	75	95	1 10	1 25	1 35	1 50	1 60	1 85	2 10
4½	90	1 10	1 25	1 40	1 55	1 70	1 85	2 15	2 45
5	1 00	1 20	1 40	1 60	1 80	2 00	2 20	2 60	3 00
6	1 40	1 60	1 75	2 10	2 40	2 75	3 05	3 70	4 35
7	1 85	2 00	2 15	2 60	3 00	3 45	3 85	4 70	5 55
8	2 10	2 35	2 60	3 10	3 60	4 10	4 60	5 60	6 60
9	2 50	2 80	3 10	3 70	4 25	4 85	5 40	6 55	7 70
10	3 00	3 35	3 65	4 35	5 00	5 70	6 35	7 70	9 05
12	3 60	3 80	4 00	5 00	6 00	6 70	7 40	9 00	10 70
14	4 05	5 15	6 25	7 35	8 45	9 55	10 65	12 85	15 05
16	.....	.....	.....	.....	10 85	12 30	13 70	16 55	19 40
18	.....	.....	.....	.....	13 25	15 15	17 00	20 75	24 50
20	.....	.....	.....	.....	.....	.....	20 25	24 75	29 25
22	.....	.....	.....	.....	.....	.....	25 00	31 00	37 00
24	.....	.....	.....	.....	.....	.....	29 00	36 00	43 00
26	.....	.....	.....	.....	.....	.....	.....	43 00	51 00
30	.....	.....	.....	.....	.....	.....	.....	.....	61 00
36	.....	.....	.....	.....	.....	.....	.....	.....	95 00

Diameter in Inches.	Thickness of Wheels in Inches.								
	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3	$3\frac{1}{4}$	$3\frac{1}{2}$	4
1	\$ 55	\$ 60	\$ 65	\$ 70	\$ 75	\$ 80	\$ 85	\$ 90	\$ 1 00
1½	65	70	75	80	85	90	95	1 00	1 10
2	75	80	85	90	95	1 00	1 05	1 10	1 20
2½	1 15	1 25	1 35	1 45	1 55	1 65	1 75	1 85	2 05
3	1 55	1 70	1 85	2 00	2 15	2 30	2 45	2 60	2 90
3½	1 95	2 15	2 35	2 55	2 75	2 95	3 15	3 35	3 75
4	2 35	2 60	2 85	3 10	3 35	3 60	3 85	4 10	4 60
4½	2 75	3 05	3 35	3 65	3 95	4 25	4 55	4 85	5 45
5	3 40	3 80	4 20	4 60	5 00	5 40	5 80	6 20	7 00
6	5 00	5 65	6 30	6 95	7 60	8 25	8 90	9 55	10 85
7	6 40	7 25	8 10	8 95	9 80	10 65	11 50	12 35	14 05
8	7 60	8 60	9 60	10 60	11 60	12 60	13 60	14 60	16 60
9	8 85	10 00	11 15	12 30	13 45	14 60	15 75	16 90	19 20
10	10 40	11 75	13 10	14 45	15 80	17 15	18 50	19 85	22 55
12	12 75	14 00	15 70	17 40	19 00	20 75	22 50	24 25	27 50
14	17 25	19 45	21 65	23 85	26 05	28 25	30 45	32 65	37 05
16	22 25	25 00	27 95	30 80	33 65	36 50	39 35	42 20	47 90
18	28 25	32 00	35 75	39 50	43 25	47 00	50 75	54 50	62 00
20	33 75	38 25	42 75	47 25	51 75	56 25	60 75	65 25	74 25
22	43 00	49 00	55 00	61 00	67 00	73 00	79 00	85 00	97 00
24	50 00	57 00	64 00	71 00	78 00	85 00	92 00	99 00	113 00
26	59 00	67 00	75 00	83 00	91 00	99 00	107 00	115 00	131 00
30	72 00	83 00	94 00	105 00	116 00	127 00	138 00	149 00	171 00
36	110 50	126 00	141 50	157 00	172 50	188 00	203 50	219 00	250 00



Figure 146.

A partial view of our Supply Room, where we carry a large stock of Fittings for Steam and Hot Water Heating.

ASBESTOS PIPE COVERING.



Figure 147.

PRICE LIST.

SIZE.	Cover- ing, Per lineal ft	Elbows Each	Tees Each	Valves Each	Cross's Each	SIZE.	Cover- ing Per lineal ft	Elbows Each	Tees Each	Valves Each.	Cross's Each.
Inside Diam.						Inside Diam.					
1/2 in.	\$0.20	\$0.25	\$0.33	\$0.25	\$0.35	4 in.	\$0.44	\$0.44	\$0.59	\$0.59	\$0.73
3/4 "	.22	.25	.33	.25	.43	4 1/2 "	.47	.47	.63	.63	.80
1 "	.23	.25	.33	.25	.43	5 "	.50	.50	.67	.67	.90
1 1/4 "	.24	.25	.33	.25	.43	6 "	.58	.58	.77	.77	1.00
1 1/2 "	.25	.25	.33	.25	.43	7 "	.66	.66	.88	.88	1.10
2 "	.27	.27	.36	.27	.48	8 "	.73	.73	.97	.97	1.20
2 1/2 "	.31	.31	.41	.41	.53	9 "	.80	.80	1.07	1.07	1.35
3 "	.36	.36	.48	.48	.60	10 "	.90	.90	1.20	1.20	1.50
3 1/2 "	.40	.40	.53	.53	.68	12 "	1.10	1.10	1.40	1.40	1.80

So as not to confuse our trade we have but one price list for our different grades of coverings. Our discounts regulate the cost of our goods. Write for special net prices.

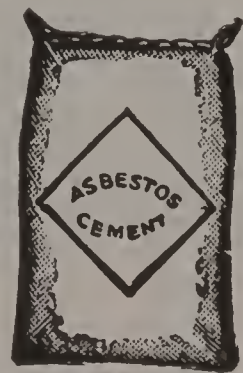


Figure 148.

Asbestos Cement.

STANDARD LAP-WELDED BOILER TUBES.

Outside Diameter Inches.	Price Per Foot.	Thickness Inches.	Thickness Nearest B. W. G.	Nominal Weight Per Foot.
1	\$.30	.095	13	.90
1¼	.28	.095	13	1.15
1½	.27	.095	13	1.40
1¾	.22	.095	13	1.66
2	.20	.095	13	1.91
2¼	.24	.095	13	2.16
2½	.28	.109	12	2.75
2¾	.34	.109	12	3.04
3	.35	.109	12	3.33
3¼	.40	.120	11	3.96
3½	.44	.120	11	4.28
3¾	.50	.120	11	4.60
4	.55	.134	10	5.47
4½	.62	.134	10	6.17
5	.75	.148	9	7.58
6	1.00	.165	8	10.16
7	1.20	.165	8	11.90
8	1.50	.165	8	13.65
9	1.70	.180	7	16.76
10	2.10	.203	6	21.00
11	2.50	.220	5	25.00
12	2.90	.229	4½	28.50
13	3.20	.238	4	32.06
14	3.65	.248	3½	36.00
15	4.10	.259	3	40.60
16	4.60	.270	2½	45.20

EXTRA WIRE GAUGE BOILER TUBES.

For extra wire gauge boiler tubes, away from standard not exceeding four wire gauges, one cent for each inch in diameter of tube for each additional gauge will be charged and added to net of invoice.

Tubes more than four wire gauges heavier than standard will be charged by the pound the same as plain end stay tubes, arch pipes, dry pipes and water grates.

STANDARD STEAM, GAS AND WATER PIPE.

BLACK AND GALVANIZED.

Nominal Inside Diameter.	Price Per Foot.	Thickness.	Nominal Weight Per Foot.	Number of Threads Per Inch of Screw.
$\frac{1}{8}$	.05 $\frac{1}{2}$	.068	0.24	27
$\frac{1}{4}$	.05 $\frac{1}{2}$	.088	0.42	18
$\frac{3}{8}$	.05 $\frac{1}{2}$	.091	0.56	18
$\frac{1}{2}$	.08 $\frac{1}{2}$	.109	0.84	14
$\frac{3}{4}$	.11 $\frac{1}{2}$	.113	1.12	14
1	.16 $\frac{1}{2}$	.134	1.67	11 $\frac{1}{2}$
1 $\frac{1}{4}$	.22 $\frac{1}{2}$	.140	2.24	11 $\frac{1}{2}$
1 $\frac{1}{2}$	.27	.145	2.68	11 $\frac{1}{2}$
2	.36	.154	3.61	11 $\frac{1}{2}$
2 $\frac{1}{2}$	.57 $\frac{1}{2}$	.204	5.74	8
3	.75 $\frac{1}{2}$	.217	7.54	8
3 $\frac{1}{2}$	.95	.226	9.00	8
4	1.08	.237	10.66	8
4 $\frac{1}{2}$	1.30	.246	12.49	8
5	1.45	.259	14.50	8
6	1.88	.280	18.76	8
7	2.35	.301	23.27	8
8	2.82	.322	28.18	8
9	3.40	.344	33.70	8
10	4.25	.366	40.00	8
11	4.75	.375	45.00	8
12	5.20	.375	49.00	8

Unless otherwise ordered, black pipe, random lengths, with threads and couplings, will be shipped.

For cut lengths an extra charge will be made above random lengths.

For pipe smoothed on the inside, known as plugged and reamed, an extra charge will be made above regular pipe.

For galvanized pipe an extra charge will be made above black.

For asphalted pipe an extra charge will be made above black.

LARGE O. D. PIPE.

PLAIN ENDS

Revised and adopted May 1, 1902.

Size O. D.	$\frac{1}{4}$ in. Thick.	$\frac{5}{16}$ in. Thick.	$\frac{3}{8}$ in. Thick.	$\frac{7}{16}$ in. Thick.	$\frac{1}{2}$ in. Thick.	Size O. D.	$\frac{1}{4}$ in. Thick.	$\frac{5}{16}$ in. Thick.	$\frac{3}{8}$ in. Thick.	$\frac{7}{16}$ in. Thick.	$\frac{1}{2}$ in. Thick.
14	3.85	4.80	5.75	6.65	7.60	21	.....	7.25	8.65	10.10	11.50
15	4.15	5.15	6.15	7.15	8.15	22	.....	7.60	9.10	10.60	12.10
16	4.40	5.50	6.60	7.65	8.70	24	.....	.....	9.95	11.60	13.15
17	4.70	5.85	7.00	8.15	9.25	26	.....	.....	11.30	13.15	14.95
18	4.95	6.20	7.40	8.60	9.80	28	.....	.....	12.15	14.15	16.15
20	5.50	6.90	8.25	9.60	10.95	30	.....	.....	.....	15.20	17.65

This pipe will be shipped in random lengths, plain ends, unless otherwise ordered.

For cut lengths an extra charge above random will be made.

For threaded pipe an extra charge above plain end will be made.

STEAM, GAS AND WATER PIPE.

EXTRA STRONG.

Size Inches.	Actual Outside Diameter.	Nominal Inside Diameter.	Thick- ness.	Nominal Weight per Foot.	Price per Foot.
1/8	.405	.205	.100	.29	.11
1/4	.540	.294	.123	.54	.11
3/8	.675	.421	.127	.74	.11
1/2	.840	.542	.149	1.09	.12
3/4	1.05	.736	.157	1.39	.15
1	1.315	.951	.182	2.17	.22
1 1/4	1.66	1.272	.194	3.00	.30
1 1/2	1.90	1.494	.203	3.63	.36
2	2.375	1.933	.221	5.02	.50
2 1/2	2.875	2.315	.280	7.67	.81
3	3.500	2.892	.304	10.25	1.05
3 1/2	4.000	3.358	.321	12.47	1.33
4	4.500	3.818	.341	14.97	1.50
4 1/2	5.000	4.280	.360	18.22	1.95
5	5.563	4.813	.375	20.54	2.16
6	6.625	5.750	.437	28.58	2.90
7	7.625	6.625	.500	37.67	3.80
8	8.625	7.625	.500	43.00	4.30

DOUBLE EXTRA STRONG.

Size Inches.	Actual Outside Diameter.	Nominal Inside Diameter.	Thick- ness.	Nominal Weight per Foot.	Price per Foot.
1/2	.84	.244	.298	1.70	.25
3/4	1.05	.422	.314	2.44	.30
1	1.315	.587	.364	3.65	.37
1 1/4	1.66	.885	.388	5.20	.52
1 1/2	1.90	1.088	.406	6.40	.65
2	2.375	1.491	.442	9.02	.95
2 1/2	2.875	1.755	.560	13.68	1.37
3	3.50	2.284	.608	18.56	1.92
3 1/2	4.00	2.716	.642	22.75	2.45
4	4.50	3.136	.682	27.48	2.85
4 1/2	5.00	3.564	.718	32.53	3.30
5	5.563	4.063	.75	38.12	3.80
6	6.625	4.875	.875	53.11	5.30
7	7.625	5.875	.875	62.38	6.25
8	8.625	6.875	.875	71.62	7.20

Extra Strong and Double Extra Strong will be shipped in random lengths and plain ends unless otherwise ordered.

For pipe fitted with threads and couplings an extra charge will be made above regular.

For cut lengths an extra charge will be made above random.

For galvanized or asphalted an extra charge will be made above black.

Extra Heavy or Hydraulic Tubes away from Standard. Special prices given on application.

PRICE LIST FOR CUTTING AND
THREADING PIPE.

Standard Threads for Wrought Iron Pipe.

Size Inches..	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price Each.....	05	05	05	05	05	06	07	08	10	15	20	25	35
Size Inches.....	4 1/2	5	6	7	8	9	10	12	14	16	18	20	
Price Each.....	45	55	70	85	1.00	1.25	1.50	2.50	3.50	5.00	8.00	10.00	

CAST IRON WATER AND GAS PIPE.

IN LENGTHS 12 FEET LONG.



Figure 149.

WATER PIPE.

Size, inches.	3	4	6	8	10	12	14	16	18	20	24	30	36
Thickness, inches... ..	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{3}{8}$
Weight per foot, pounds....	17	22	33	42	60	75	117	125	167	197	250	350	475

GAS PIPE.

Size, inches.....	3	4	6	8	10	12	14	16	18	20	24	30	36
Thickness, inches... ..	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{3}{4}$	$1\frac{1}{8}$	$\frac{7}{8}$
Weight per foot, pounds....	$12\frac{1}{2}$	18	30	40	55	70	85	104	134	150	190	277	350

APPROXIMATE QUANTITIES OF LEAD AND HEMP
REQUIRED PER JOINT.

Size, inches	3	4	6	8	10	12	14	16	18	20	24	30	36
Lead, pounds.....	4	$5\frac{1}{2}$	8	11	15	18	22	24	26	28	32	38	50
Hemp, ounces.....	6	7	9	11	13	18	20	22	24	28	32	38	44

QUARTER BENDS OR ELBOWS.

SPECIALS FOR CAST IRON PIPE.

Size, inches.....	3	4	6	8	10	12	14	16	18	20	24	30
Weight each, pounds	48	60	112	200	266	376	450	650	750	1000	1500	2500

EIGHTH BENDS.

Size, inches.	3	4	6	8	10	12	14	16	18	20	24	30
Weight each, pounds	42	60	125	200	276	390	430	510	820	1200	1450	2200

SLEEVES.

Size, inches.....	3	4	6	8	10	12	14	16	18	20	24	30
Weight each, pounds	30	42	76	110	146	208	300	360	360	557	710	965

PLUGS.

Size, inches	3	4	6	8	10	12	14	16	18	20	24	30
Weight each, pounds	10	12	22	32	46	66	70	100	125	150	185	370

CAPS.

Size, inches... ..	3	4	6	8	10	12
Weight each, pounds	15	25	60	75	100	120

The above weights on Cast Iron Pipe and Specials are approximate only and are given simply for convenience in estimating.

Unless otherwise ordered all Cast Iron Water Pipe will be furnished coated inside and out, and Gas Pipe will be furnished not coated.

TEES.

Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds	Size, Inches.	Weight, Pounds.
3x3x3	80	8x 8x 4	250	12x12x10	525	24x24x24	2000
4x4x4	100	10x10x10	390	12x12x 8	510	30x30x30	2880
6x6x6	204	10x10x 8	354	12x12x 6	500	36x36x36	4920
6x6x4	154	10x10x 6	312	12x12x 4	480	48x48x48	9000
8x8x8	294	10x10x 4	300	16x16x16	900		
8x8x6	266	12x12x12	540	20x20x20	1390		

CROSSES.

Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.
3x3x3x3	100	8x 8x 4x 4	296	12x12x10x10	670	24x24x24x24	2400
4x4x4x4	130	10x10x10x10	500	12x12x 8x 8	625	30x30x30x30	3600
6x6x6x6	200	10x10x 8x 8	496	12x12x 6x 6	600	36x36x36x36	6160
6x6x4x4	190	10x10x 6x 6	376	12x12x 4x 4	572	48x48x48x48	10500
8x8x8x8	400	10x10x 4x 4	370	16x16x16x16	1020		
8x8x6x6	354	12x12x12x12	714	20x20x20x20	1600		

REDUCERS.

Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.
4 x 3	80	10 x 6	270	14 x 12	475	20 x 14	575
6 x 4	150	10 x 4	260	14 x 10	430	20 x 12	540
6 x 3	120	12 x 10	310	14 x 8	340	24 x 20	766
8 x 6	220	12 x 8	318	16 x 12	475	30 x 24	1022
8 x 4	180	12 x 6	300	16 x 10	435	30 x 18	1000
10 x 8	300	12 x 4	280	20 x 16	690	36 x 30	1730

INCREASERS.

Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.	Size, Inches.	Weight, Pounds.
4 x 3	78	8 x 6	164	10 x 8	204	12 x 10	332
6 x 4	108	10 x 4	185	12 x 6	230		
8 x 4	162	10 x 6	195	12 x 8	318		

Y BRANCHES.

Lateral or Y Branches can be furnished in all sizes from 4 to 36 inches.

The above weights are approximate only, and given simply for convenience in estimating

CAST IRON FITTINGS.



Figure 150.
Straight Elbow.



Figure 151.
Reducing Elbow.

Elbows—Straight Sizes.—Fig. 150

Size	.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Each	.....	.05	.05	.06	.08	.10½	.16	.20	.28	.50	.75
Size	.....	3½	4	4½	5	6	7	8	9	10	12
Each	.....	1.05	1.20	1.75	2.00	2.75	4.70	6.75	9.00	13.50	20.00

Elbows—Reducing Sizes.—Fig. 151

Size	.....	⅜	½	¾	1	1¼	1½	2	2½	3	3½
Each	.....	.06	.07	.09	.12	.18	.23	.32	.60	.85	1.20
Size	.....	4	4½	5	6	7	8	9	10	12	
Each	.....	1.40	2.00	2.30	3.15	5.40	7.75	10.50	15.50	23.00	

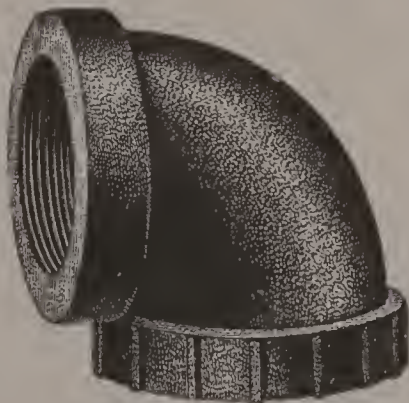


Figure 152.
Right and Left Elbow.



Figure 153.
45° Elbow.

Elbows—Right and Left.—Fig. 152

Size	.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Each	.....	.06	.06	.07	.09	.12	.18	.23	.32	.60	.85					

Elbows—45°—Fig. 153

Size	.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½				
Each	.....	.06	.06	.07	.10	.12	.19	.24	.34	.60	.90	1.25				
Size	.....	4	4½	5	6	7	8	9	10	12						
Each	.....	1.45	2.20	2.50	3.45	5.90	8.50	11.25	17.00	25.00						

CAST IRON FITTINGS (Continued).

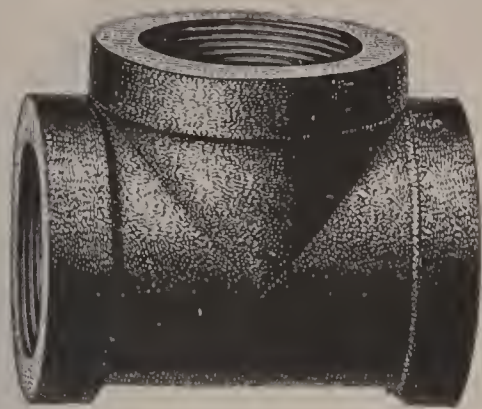


Figure 154
Straight Tee.

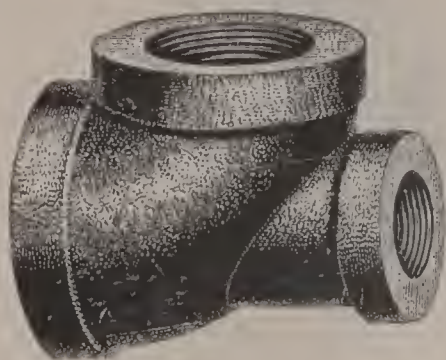


Figure 155.
Reducing Tee.

Tees—Straight Sizes.—Fig. 154

Size	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Each	.08	.08	.09	.12	.15	.23	.29	.41	.73	1.10
Size	3 1/2	4	4 1/2	5	6	7	8	9	10	12
Each	1.50	1.75	2.55	3.00	4.00	6.80	9.75	13.00	19.50	29.00

Tees—Reducing Sizes.—Fig. 155

Size	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2
Each	.09	.10	.14	.17	.27	.33	.47	.83	1.25	1.75
Size	4	4 1/2	5	6	7	8	9	10	12	
Each	2.00	2.95	3.50	4.60	7.80	11.25	15.00	22.50	33.50	

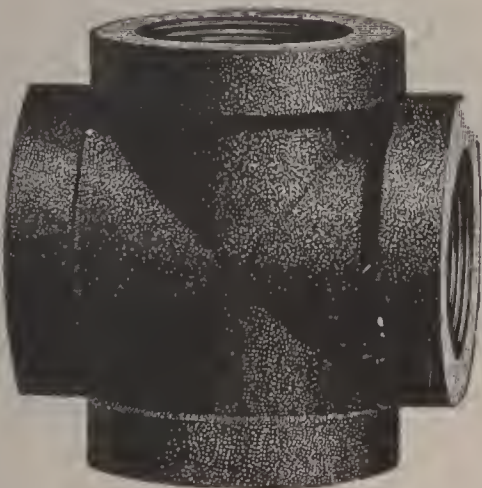


Figure 156.
Straight Cross.



Figure 157.
Reducing Cross.

Crosses—Straight Sizes.—Fig. 156

Size	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2
Each	.15	.16	.22	.27	.42	.53	.75	1.30	2.00	2.70	3.15	4.60
Size				5	6	7	8	9	10	12		
Each				5.50	7.25	12.25	17.50	23.50	35.00	52.50		

Crosses—Reducing Sizes.—Fig. 157

Size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2
Each	.18	.25	.30	.46	.60	.83	1.45	2.20	3.00	3.50	5.10
Size				5	6	7	8	9	10	12	
Each				6.00	8.00	13.50	19.25	26.00	38.50	58.00	

CAST IRON FITTINGS (Continued).



Figure 158.
Reducing Coupling.

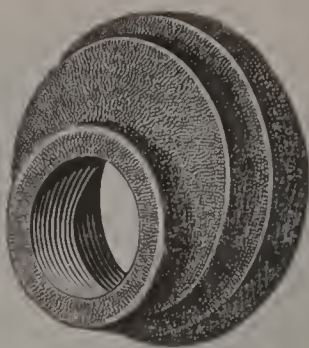


Figure 159.
Offset Reducing Coupling.

Reducing Couplings—Fig. 158

Size	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Each	.43	.60	.80	1.00	1.35	1.85	2.00	2.70	5.35	6.75	8.35	10.00	15.00

Offset Reducing Couplings.—Fig. 159

Size	2 x 1½	2½ x 1¼	2½ x 1½	2½ x 2	3 x 2	3 x 2½	3½ x 3	3½ x 2½	4 x 3½	4 x 3	5 x 4	6 x 4
Each	1.00	1.50	1.50	1.50	2.40	2.40	3.00	3.00	4.00	4.00	6.00	8.00



Figure 160.
Square Head Plug.

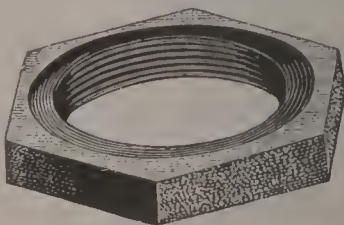


Figure 161.
Locknut.



Figure 162.
Socket Plug.

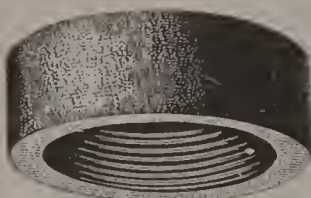


Figure 163.
Cap.

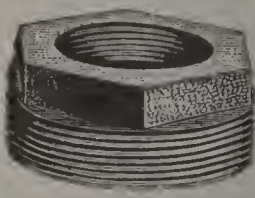


Figure 164.
Bushing.

Plugs.—Square Head.—Fig. 160

Size	.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½
Each	.....	.02	.02	.02	.03	.04	.05	.07	.10	.18	.25	.38
Size	.....	4	4½	5	6	7	8	9	10	12		
Each	.....	.42	.65	.88	1.20	1.85	2.75	3.25	3.75	5.00		

Locknuts.—Fig. 161

Size	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Each	.25	.27	.34	.47	.64	.85	.90	1.30	1.70	2.35	2.70	3.00	4.00

Straight Bushings, i.e., sizes that reduce one size only, up to and including 2½", are not made except in malleable; hence the above prices up to and including 2½" are for Bushings reducing more than one size, as 1 x ½, 2 x 1, etc. Bushings 3" and larger reduce one or more sizes.

(Continued on opposite page.)

CAST IRON FITTINGS (Continued).

Caps.—Fig. 163

Size	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Each	.26	.40	.54	.75	.87	1.05	1.20	1.55	2.50	2.85	4.75	5.50	7.00

Socket Plugs.—Fig. 162

Size	½	¾	1	1¼	1½	2
Socket plugs, Fig. 14, each.....	.04	.06	.08	.09	.11	.15
Plugs tapped for air cock, each.....	..	.12	.15	.20	.25	.30
Left-hand plugs, each.....	..	.06	.08	.09	.11	.15
Solid plugs, each.....	.04	.06	.08	.09	.11	.15

Bushings.—Fig. 164

Size	.....	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5
Each	.....	.04	.05	.06	.07	.09	.14	.21	.30	.40	.50	.75	.93
Size	.....							6	7	8	9	10	12
Each	.....							1.25	1.87	2.75	3.25	3.75	5.00



Figure 165.
Offset.

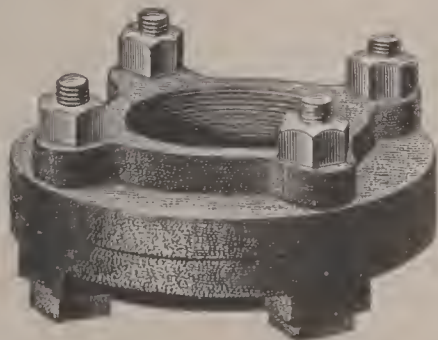


Figure 166.
Flange Union.

Offsets.—Fig. 165

Size	¾	1	1¼	1½	2	2½	3	3½	4	5	6
To offset 4 inches	.45	.70	1.00	1.20	1.80	3.00	4.00	5.00	6.00	8.00	10.00
To offset 6 inches	.67	1.05	1.50	1.80	2.70	4.50	6.00	7.50	9.00	12.00	15.00
To offset 8 inches	.90	1.40	2.00	2.40	3.60	6.00	8.00	10.00	12.00	16.00	20.00

Flange Unions.—Fig. 166

Size	½	¾	1	1¼	1½	2	2½	3	3½	4
Diameter of flanges.....	3	3¼	3⅝	4¼	4⅝	5¼	5¾	6¾	7¼	8
Number of bolts.....	4	4	4	4	4	4	4	4	4	5
Each	.40	.46	.52	.64	.78	1.00	1.25	1.50	1.80	2.10

Size	4½	5	6	7	8	9	10	12
Diameter of flanges.....	8¾	9½	10¾	12½	14	15	17	19
Number of bolts.....	5	5	6	6	8	8	10	12
Each	2.70	3.15	3.95	5.50	7.00	10.00	11.50	16.00

CAST IRON FITTINGS (Continued).



Figure 167.
Side Outlet Elbow.

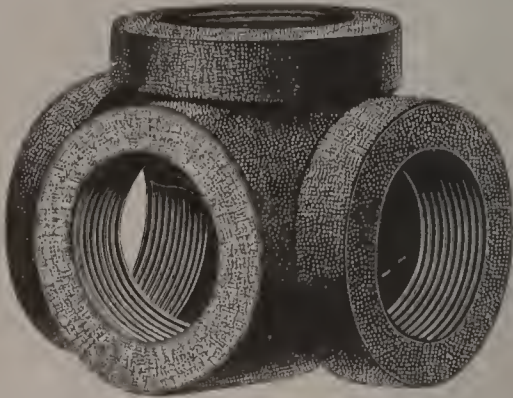


Figure 168.
Side Outlet Tee.

Side Outlet Elbows.—Fig. 167

Size	.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Each	.....	.18	.24	.30	.48	.60	.84	1.50	2.25	3.15	3.60	5.25	6.00	8.25

Side Outlet Tees.—Fig. 168

Size	.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Each	.....	.27	.36	.45	.70	.90	1.25	2.25	3.25	4.50	5.25	7.65	9.00	12.00

We
are
prepared
to cut
pipe
from
1/8 inch to 20 inch



Valves
Fittings
and pipe
furnished
to sketch
on short
notice

CAST IRON FITTINGS (Continued).

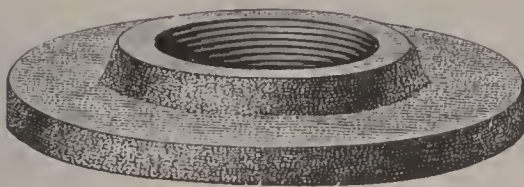


Figure 169.
Cast-Iron Flange.

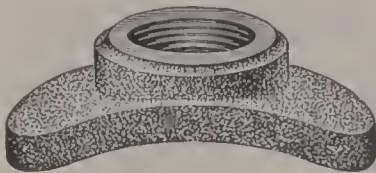


Figure 170.
Curved Flange.

Cast Iron Flanges.—Fig. 169

Size Pipe.	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Diameter.																		
3	.10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
$3\frac{1}{2}$	.15	.15	.15	.16	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	.22	.22	.16	.16	...	...	...	...	...	...	...	...	...	...	...	...	...	...
$4\frac{1}{2}$	.25	.25	.25	.25	.22	...	...	...	...	...	...	...	...	...	...	...	...	...
5	.35	.30	.30	.30	.30	.35	...	...	...	...	...	...	...	...	...	...	...	...
$5\frac{1}{2}$	.45	.45	.40	.40	.40	.35	.40	...	...	...	...	...	...	...	...	...	...	...
6	.50	.50	.42	.40	.40	.42	.42	.50	...	...	...	...	...	...	...	...	...	...
$6\frac{1}{2}$	.65	.60	.60	.60	.55	.50	.50	.50	.65	...	...	...	...	...	...	...	...	...
7	.75	.75	.75	.70	.70	.62	.62	.62	.75	...	...	...	...	...	...	...	...	...
$7\frac{1}{2}$	.90	.90	.90	.85	.85	.80	.80	.75	.85	.90	...	...	...	...	...	...	...	...
8	1.00	1.00	1.00	.95	.95	.90	.90	.90	.90	.90	...	...	...	...	...	...	...	...
$8\frac{1}{2}$	1.25	1.25	1.25	1.15	1.15	1.10	1.10	1.10	1.00	1.00	...	...	...	...	...	...	...	...
9	...	...	1.35	1.35	1.35	1.30	1.25	1.15	1.15	1.15	1.15	1.40	...	...	...	...	...	...
$9\frac{1}{2}$	...	...	...	1.90	1.90	1.75	1.75	1.60	1.60	1.50	1.25	1.50	1.50	...	...	...	...	...
10	...	...	...	2.25	2.25	2.15	2.00	1.80	1.50	1.50	1.50	1.50	1.50	...	...	...	...	...
11	...	...	...	...	...	2.50	2.50	2.25	2.25	2.00	1.75	1.75	1.75	2.20	...	...	...	...
12	...	...	...	...	...	...	3.00	3.00	2.75	2.50	2.50	2.20	2.20	2.20	2.80	...	...	...
13	...	...	...	...	...	...	...	3.50	3.50	3.25	3.00	3.00	2.80	2.80	2.80	...	...	...
14	...	...	...	...	...	...	...	4.00	4.00	3.75	3.75	3.50	3.25	3.25	3.25	3.75	4.00	...
15	...	...	...	...	...	...	...	...	...	...	...	...	...	4.00	4.00	4.00	4.50	...
16	...	...	...	...	...	...	...	...	...	...	...	...	...	5.00	5.00	5.00	5.00	6.00
17	...	...	...	...	...	...	...	...	...	...	...	...	...	6.50	6.50	5.75	5.75	7.00
18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8.00	8.00	7.00	7.00
19	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7.50	7.50
20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8.50
Size Pipe.	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12

Curved Flanges—Fig. 170—made to order at double above prices.

CAST IRON FITTINGS (Continued).

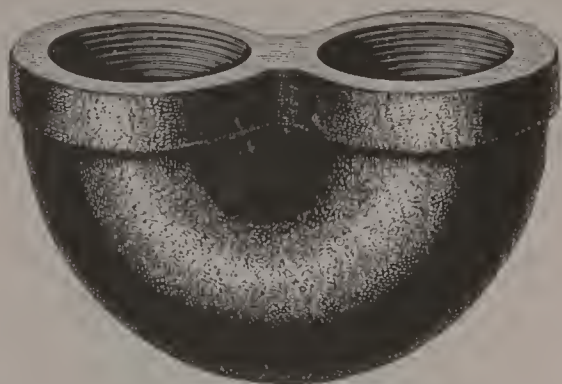


Figure 171.
Return Bend—Close Pattern.

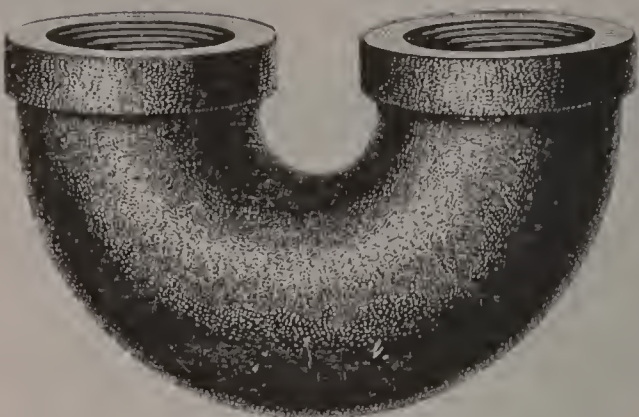


Figure 172.
Return Bend—Open Pattern.

Return Bends—Close Pattern.—Fig. 171								
Size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Centre to centre.....	1 1/2	1 1/2	1 3/4	2 1/4	2 3/4	3 1/4	3 1/2	4 3/8
Each	.18	.20	.22	.28	.40	.57	1.20	1.70
Right and left, each.....	.21	.23	.26	.33	.46	.66	1.40	1.95
With pitch,to order, each.....	...	...	.26	.33	...	...	...	...

Return Bends—Open Pattern.—Fig. 172								
Size	3/4	1	1 1/4	1 1/2	2	2 1/2	3	
Centre to centre.....	2 1/8	2 1/2	3 1/8	3 1/4	4	5	6 1/2	
Each	.26	.30	.40	.55	.80	1.35	2.20	
Right and left, each.....	.30	.35	.46	.64	.92	1.55	2.50	

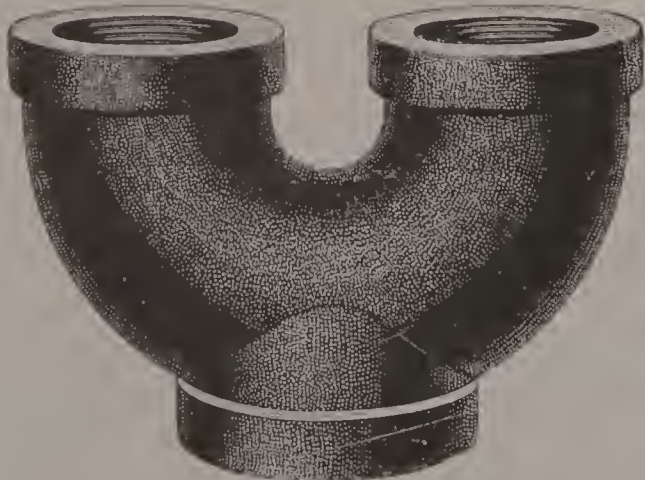


Figure 173.
Return Bend—Back Outlet.

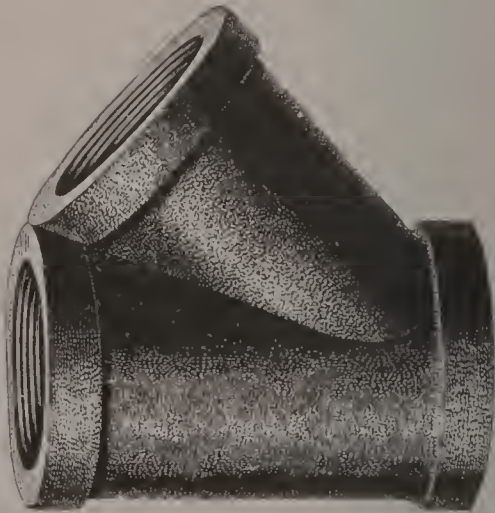


Figure 174.
Y Branch.

Return Bends—Back Outlet.—Fig. 173								
Size	3/4	1	1 1/4	1 1/2	2	2 1/2	3	
Centre to centre.....	2 1/8	2 1/2	3 1/8	3 1/4	4	5	6 1/2	
Each	.38	.42	.60	.80	1.15	2.00	3.00	

Y Branches.—Fig. 174																	
Size.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	10	12
Each.....	.20	.28	.34	.54	.66	.94	1.66	2.50	3.50	4.00	5.90	7.00	9.20	15.60	22.50	45.00	67.00
Reducing, Each	.23	.33	.40	.62	.76	1.08	1.90	2.90	4.00	4.60	6.80	8.00	10.60	18.00	26.00	51.75	77.00

BRANCH TEES.

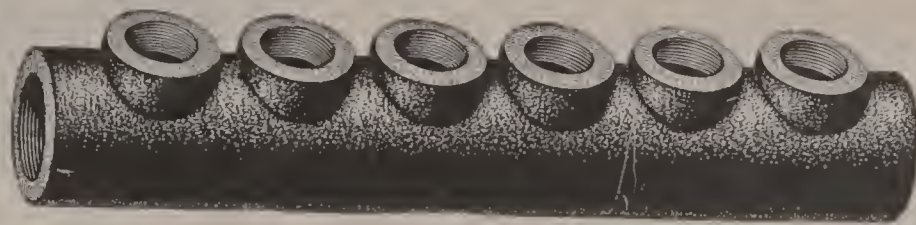


Figure 175.
Style A.

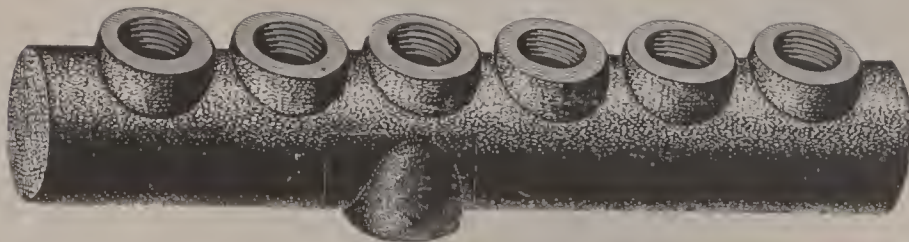


Figure 176.
Style B.

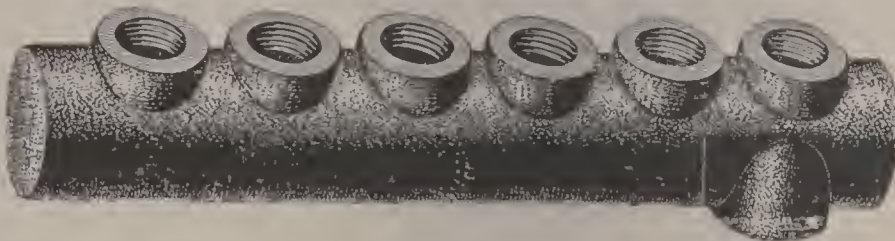


Figure 177.
Style C.

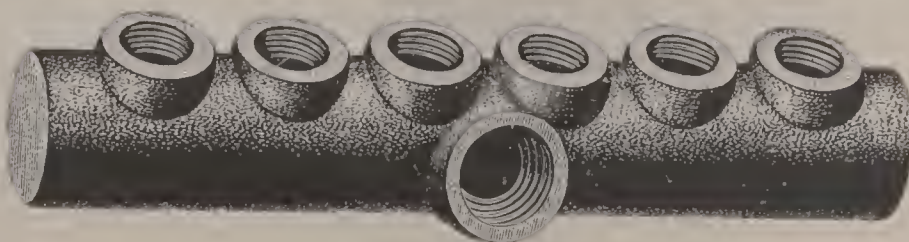


Figure 178.
Style D.

Branch Tees, No. 1.—Fig. 175

$1\frac{3}{4}$ inside diameter, $2\frac{1}{2}$ centre to centre, for $\frac{3}{4}$ -in. pipe.

No. branches	2	3	4	5	6	7	8	9	10	12
With 1 or $1\frac{1}{4}$ -in. run.....	.70	.80	.95	1.10	1.35	2.05	2.35	2.55	2.85	3.75

Branch Tees, No. 2.—Fig. 175

$1\frac{3}{4}$ inside diameter, $2\frac{1}{2}$ centre to centre, for 1-in. pipe.

No. branches	2	3	4	5	6	7	8	9	10	12
With 1 or $1\frac{1}{4}$ -in. run.....	.90	1.05	1.15	1.35	1.60	1.90	2.20	2.65	3.15	4.40

Branch Tees, No. 3.—Fig. 175

$2\frac{1}{2}$ inside diameter, $2\frac{1}{2}$ centre to centre, for 1-in. pipe.

No. branches	2	3	4	5	6	7	8	9	10	12
With $1\frac{1}{2}$ -in. run.....	1.00	1.15	1.30	1.45	1.75	2.20	2.45	2.90	3.30	4.75

All above prices are for Tees of style shown by Fig. 175.

Back or Side Outlets, as shown by Figs. 176, 177 and 178, are charged as additional Front Outlets. When not otherwise ordered, all openings are tapped right-hand.

Back or Side Outlets larger than the size of run will add 50 per cent. to above prices.

(Continued on following page.)

BRANCH TEES.—Continued.

Branch Tees, No. 4.—Fig. 175

27⁄8 inside diameter, 2½ centre to centre, for 1-in. pipe.

No. branches	2	3	4	5	6	7	8	9	10	12
With 2-in. run.....	1.15	1.35	1.60	1.85	2.10	2.45	2.75	3.40	4.00	5.10
With 2½-in. run.....	1.75	2.05	2.40	2.75	3.10	3.50	3.75	4.30	5.00	5.85

Branch Tees, No. 5.—Fig. 175

23⁄8 inside diameter, 3 centre to centre, for 1¼-in. pipe.

No. branches	2	3	4	5	6	7	8	9	10	12
With 1¼ or 1½-in. run..	1.30	1.65	2.00	2.40	2.80	3.20	3.60	4.30	4.80	5.25

Branch Tees, No. 6.—Fig. 175

27⁄8 inside diameter, 3 centre to centre, for 1¼-in. pipe.

No. branches	2	3	4	5	6	7	8	9	10	12
With 2-in. run.....	1.50	1.90	2.40	2.90	3.30	3.90	4.50	5.25	5.85	6.50

Branch Tees, No. 7.—Fig. 175

3 inside diameter, 3 centre to centre, for 1¼-in. pipe.

No. branches	2	3	4	5	6	7	8	9	10	12
With 2½-in. run.....	1.95	2.40	2.85	3.55	3.95	4.20	4.95	6.15	6.85	7.65

Branch Tees, No. 8.—Fig. 175

3 centre to centre, for 1½-inch pipe.

No. branches	2	3	4	5	6	7	8	9	10	12
With 1½ or 2-in. run....	2.10	2.70	3.35	4.00	4.65	5.25	5.85	6.50	7.60	8.50
With 2½-in. run.....	2.85	3.45	4.15	5.00	5.75	6.50	7.00	8.25	9.25	10.50

Branch Tees, No. 9.—Fig. 175

4½ centre to centre, for 2-in. pipe.

No. branches	2	3	4	5	6	7	8	9	10	12
With 2-in. run.....	4.10	5.25	6.40	7.65	8.80	10.60	11.50	12.25	13.50	15.00
With 2½-in. run.....	4.50	5.75	7.00	8.50	9.75	11.75	12.75	13.50	15.00	16.50

All above prices are for Tees of style shown by Fig. 175.

Back or Side Outlets, as shown by Figs. 176, 177 and 178, are charged as additional Front Outlets. When not otherwise ordered, all openings are tapped right hand.

Back or Side Outlets larger than the size of run will add 50 per cent. to above prices.

WROUGHT NIPPLES.



Figure 179.

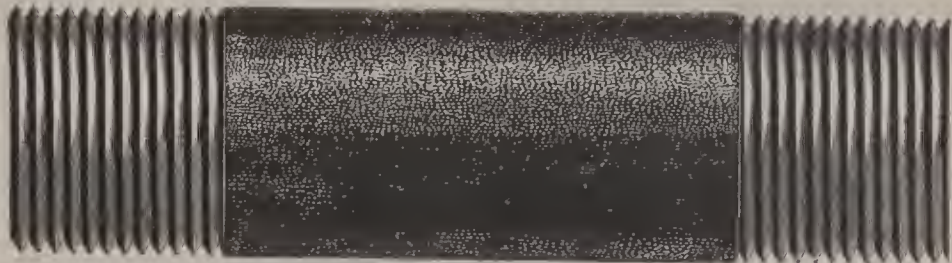


Figure 180.
PLAIN RIGHT HAND.

LENGTH IN INCHES						Size Inches	PRICES		PRICES OF EXTRA LONG R. AND L. NIPPLES								
Close	Short	Long					Close or Short	Long	Lengths in Inches								
		4	5	6	7	8			9	10	11	12					
¾	1½	2	2½	3	3½	⅛	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
7⁄8	1½	2	2½	3	3½	¼	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
1	1½	2	2½	3	3½	⅜	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
1⅛	1½	2	2½	3	3½	½	.07	.10	.11	.13	.16	.18	.21	.24	.27	.29	.31
1⅜	2	2½	3	3½	4	¾	.08	.12	....	.15	.17	.23	.25	.27	.29	.32	.35
1½	2	2½	3	3½	4	1	.11	.18	....	.20	.24	.31	.33	.37	.41	.45	.48
1⅝	2½	3	3½	4	4½	1¼	.15	.23	....	.27	.32	.39	.45	.50	.55	.60	.65
1¾	2½	3	3½	4	4½	1½	.18	.27	....	.34	.39	.48	.52	.60	.67	.72	.80
2	2½	3	3½	4	4½	2	.24	.36	....	.43	.51	.67	.72	.80	.87	.96	1.03
2½	3	3½	4	4½	5	2½	.52	.79	....	....	.91	1.20	1.30	1.40	1.55	1.68	1.80
2½	3	3½	4	4½	5	3	.65	.96	....	....	1.13	1.44	1.60	1.77	1.93	2.10	2.27
2¾	4	4½	5	5½	6	3½	1.00	1.40	....	....	....	1.75	1.95	2.15	2.35	2.55	2.75
3.	4	4½	5	5½	6	4	1.15	1.60	....	....	....	2.00	2.25	2.50	2.75	3.00	3.25

Nipples made to order from extra heavy pipe at double above list.

PLAIN RIGHT AND LEFT.

LENGTH IN INCHES.						Size Inches	PRICES		PRICES OF EXTRA LONG NIPPLES								
Close	Short	Long					Close or Short	Long	Lengths in Inches								
		4	5	6	7	8			9	10	11	12					
3/4	1 1/2	2	2 1/2	3	3 1/2	1/8	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
7/8	1 1/2	2	2 1/2	3	3 1/2	1/4	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
1	1 1/2	2	2 1/2	3	3 1/2	3/8	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
1 1/8	1 1/2	2	2 1/2	3	3 1/2	1/2	.05	.07	.08	.10	.12	.14	.16	.18	.20	.22	.23
1 3/8	2	2 1/2	3	3 1/2	4	3/4	.06	.09	....	.11	.13	.17	.18	.20	.22	.24	.26
1 1/2	2	2 1/2	3	3 1/2	4	1	.08	.13	....	.15	.18	.23	.25	.28	.31	.34	.36
1 5/8	2 1/2	3	3 1/2	4	4 1/2	1 1/4	.11	.17	....	.20	.24	.29	.33	.36	.40	.44	.47
1 3/4	2 1/2	3	3 1/2	4	4 1/2	1 1/2	.13	.20	....	.25	.29	.36	.40	.45	.50	.54	.59
2	2 1/2	3	3 1/2	4	4 1/2	2	.18	.27	....	.32	.38	.50	.54	.59	.65	.72	.77
2 1/2	3	3 1/2	4	4 1/2	5	2 1/2	.39	.59	....	....	.68	.90	.97	1.06	1.17	1.26	1.35
2 5/8	3	3 1/2	4	4 1/2	5	3	.48	.72	....	....	.85	1.08	1.20	1.33	1.45	1.58	1.70
2 3/4	4	4 1/2	5	5 1/2	6	3 1/2	.75	1.05	....	....	....	1.30	1.45	1.60	1.75	1.90	2.05
3	4	4 1/2	5	5 1/2	6	4	.85	1.20	....	....	....	1.52	1.69	1.87	2.05	2.22	2.40
3	4	4 1/2	5	5 1/2	6	4 1/2	1.25	1.70	....	....	....	2.25	2.50	2.75	2.95	3.17	3.40
3 1/2	4 1/2	5	5 1/2	6	6 1/2	5	1.55	2.45	....	....	....	2.58	2.83	3.10	3.35	3.60	3.85
3 1/2	4 1/2	5	5 1/2	6	6 1/2	6	1.85	2.90	....	....	....	3.05	3.35	3.70	4.00	4.30	4.65
4	5	6	....	....	....	7	3.20	3.60	....	....	....	4.05	4.45	4.90	5.30	5.75	6.15
4	5	6	....	....	....	8	3.55	4.05	....	....	....	4.55	5.05	5.50	6.00	6.50	7.00
5	6	8	....	....	....	9	5.25	6.50	....	....	....	....	....	7.10	7.75	8.40	9.00
5	6	8	....	....	....	10	6.75	8.25	....	....	....	....	....	8.90	9.70	10.40	11.15
....	....	....	....	....	....	11	....	....	....	....	....	....	....	....	....	....	....
5	6	8	....	....	....	12	8.00	10.00	....	....	....	....	....	10.80	11.75	12.70	13.65

Add 60 per cent. to above prices for Galvanized Nipples, threaded R. and L.
(Continued on following page.)

WROUGHT NIPPLES (Continued).
GALVANIZED RIGHT HAND.

LENGTH IN INCHES						Size Inches	PRICES		PRICES OF EXTRA LONG GALVANIZED NIPPLES								
Close	Short	Long					Close or Short	Long	Lengths in Inches								
		4	5	6	7				8	9	10	11	12				
3/4	1 1/4	2	2 1/2	3	3 1/2	1/8	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
7/8	1 1/2	2	2 1/2	3	3 1/2	1/4	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
1	1 1/2	2	2 1/2	3	3 1/2	3/8	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
1 1/8	1 1/2	2	2 1/2	3	3 1/2	1/2	.06	.11	.13	.16	.18	.23	.26	.28	.31	.33	.36
1 3/8	2	2 1/2	3	3 1/2	4	3/4	.08	.14	....	.18	.21	.26	.29	.32	.35	.38	.41
1 1/2	2	2 1/2	3	3 1/2	4	1	.11	.19	....	.24	.28	.34	.38	.42	.47	.51	.55
1 5/8	2 1/2	3	3 1/2	4	4 1/2	1 1/4	.17	.29	....	.32	.38	.45	.51	.57	.63	.69	.75
1 3/4	2 1/2	3	3 1/2	4	4 1/2	1 1/2	.21	.35	....	.39	.46	.55	.63	.70	.77	.84	.91
2	2 1/2	3	3 1/2	4	4 1/2	2	.27	.47	....	.52	.61	.74	.83	.93	1.03	1.13	1.23
2 1/2	3	3 1/2	4	4 1/2	5	2 1/2	.56	.86	....	....	1.00	1.26	1.41	1.56	1.71	1.86	2.01
2 1/2	3	3 1/2	4	4 1/2	5	3	.70	1.10	....	....	1.30	1.60	1.80	2.00	2.20	2.40	2.60
2 3/4	4	4 1/2	5	5 1/2	6	3 1/2	1.20	1.70	....	....	....	2.10	2.35	2.60	2.85	3.15	3.40
3	4	4 1/2	5	5 1/2	6	4	1.35	1.87	....	....	....	2.30	2.60	2.90	3.20	3.50	3.80
3	4	4 1/2	5	5 1/2	6	4 1/2	1.85	2.60	....	....	....	3.30	3.65	4.05	4.45	4.85	5.25
3 1/2	4 1/2	5	5 1/2	6	6 1/2	5	2.30	3.15	....	....	....	3.75	4.20	4.60	5.00	5.40	5.85
3 1/2	4 1/2	5	5 1/2	6	6 1/2	6	2.80	4.25	....	....	....	4.50	5.00	5.55	6.05	6.60	7.15
4	5	....	....	....	....	7	4.25	4.95	....	....	....	5.65	6.35	7.05	7.75	8.45	9.20
4	5	....	....	....	....	8	5.00	5.80	....	....	....	6.65	7.50	8.35	9.25	10.10	10.95

For list on R. and L. galvanized nipples add 60 per cent. to R. and L. plain nipples.

MALLEABLE FITTINGS.

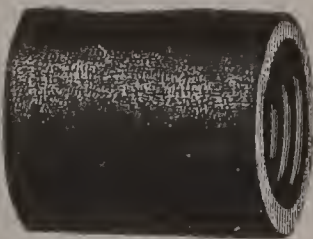


Figure 181.
Right-Hand Coupling.

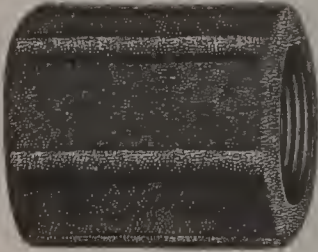


Figure 182.
Right and Left Coupling.

Malleable Couplings, Right-Hand.—Fig. 181

Size	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Plain, each	.03	.03	.04	.07	.10	.14	.20	.25	.35
Galvanized, each	..	.05	.07	.10	.17	.23	.30	.40	.55

Malleable Couplings, Right and Left.—Fig. 182

Size	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Plain, each	.04	.05	.08	.12	.16	.25	.36	.52
Galvanized, each	.06	.08	.10	.17	.25	.35	.55	.75



Figure 183.
Malleable Union.



Figure 184.
American Union.

Malleable Unions.—Fig. 183

Size	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Plain, each	.18	.18	.20	.22	.27	.33	.46	.58	.75	1.55	2.10	3.65	4.35
Galvanized, each	.27	.27	.30	.33	.40	.50	.70	.90	1.15	2.35	3.15	5.50	6.50

(Continued on opposite page.)

MALLEABLE FITTINGS (Continued).

American Unions.—Fig. 184

Size	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Plain, each	.20	.24	.28	.35	.40	.56	.80	.95	2.00	2.75
Galvanized, each	.24	.28	.35	.46	.55	.78	1.12	1.35	2.90	3.75
Tinned, each	.30	.33	.45	.55	.65	.90	1.40	1.55	...	...

Enameled fittings same list as galvanized.



Figure 185.
Gas Elbow.

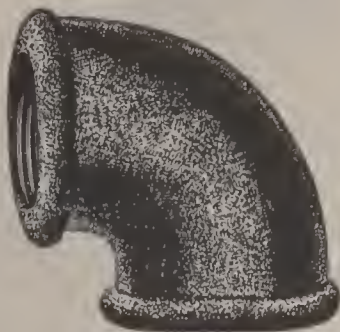


Figure 186.
Beaded Elbow.

Elbows.—Figs. 185 and 186

Size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Plain, each	.04	.04	.06	.10	.15	.22	.25	.35	.50	.80	1.50	2.25	3.00
Galvanized, each	..	.05	.08	.14	.20	.32	.40	.60	.90	1.35	2.60	3.75	5.00



Figure 187.
45° Elbow.



Figure 188.
Street Elbow.

Elbows, 45°—Fig. 187

Size	⅜	½	¾	1	1¼	1½	2
Plain, each	.10	.12	.18	.26	.36	.54	.82
Galvanized, each	.15	.20	.25	.40	.50	.85	1.35

Street Elbows.—Fig. 188

Size	⅜	½	¾	1	1¼	1½	2
Plain, each	.10	.12	.20	.25	.40	.55	.90
Galvanized, each	.12	.15	.28	.35	.55	.80	1.30

MALLEABLE FITTINGS (Continued).



Figure 189.
Side Outlet Elbow.



Figure 190.
Drop Elbow.

Side Outlet Elbows.—Fig. 189

Size	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Each	.08	.10	.18	.30	.45	.60

Drop Elbows.—Fig. 190

Size	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Plain, each	.06	.08	.12	.20	.25
Galvanized, each	..	.12	.20	.35	.40

Enameled fittings same list as galvanized.

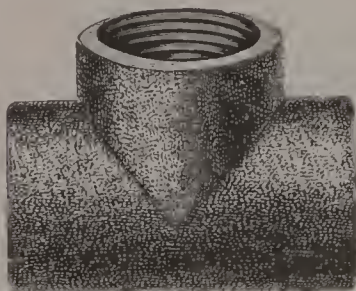


Figure 191.
Gas Tee.

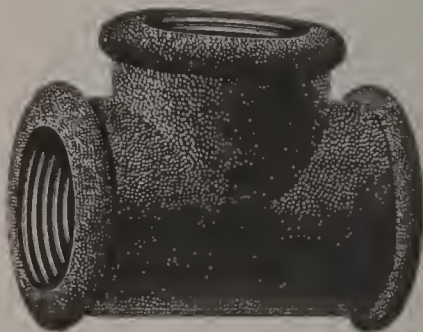


Figure 192.
Beaded Tee.

Tees.—Figs. 191 and 192

Size	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Plain, each	.07	.07	.08	.11	.15	.25	.30	.45	.60	1.05	1.70	2.50	3.40
Galvanized, each	..	..	.10	.16	.20	.38	.50	.70	1.00	1.90	3.00	4.25	5.75



Figure 193.
Side Outlet Tee.



Figure 194.
Drop Tee.

Side Outlet Tees.—Fig. 193

Size	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Plain, each	.14	.20	.35	.50

Drop Tees.—Fig. 194

Size	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Plain, each	.08	.10	.14	.22	.30
Galvanized, each	..	.15	.25	.40	.55

MALLEABLE FITTINGS (Continued).



Figure 195.
Gas Cross.



Figure 196.
Beaded Cross.

Crosses.—Figs. 195 and 196

Size	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Plain, each	.08	.10	.12	.20	.30	.40	.60	1.00	1.75	3.00	3.25	5.25
Galvanized, each	..	.15	.17	.25	.45	.60	.90	1.50	2.75	4.25	5.00	8.00

Enameled fittings same list as galvanized.

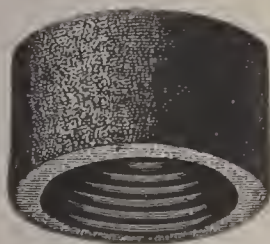


Figure 197.
Cap.



Figure 198.
Plug.

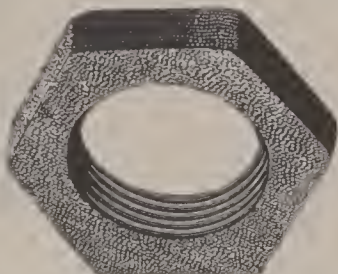


Figure 199.
Locknut.

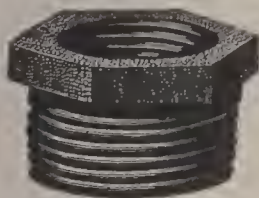


Figure 200.
Bushing.

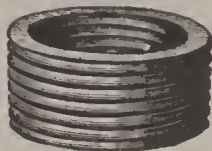


Figure 201.
Faced Bushing.



Figure 202.
Reducing Coupling.

Caps.—Fig. 197

Size	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Plain, each	.03	.04	.05	.08	.12	.16	.24	.32	.45	.85	1.50	2.00
Galvanized, each	.04	.05	.08	.12	.17	.24	.38	.52	.76	1.30	2.25	3.00

Plugs.—Fig. 198

Size	¼	⅜	½	¾	1	1¼	1½	2
Plain, each	.03	.03	.05	.08	.10	.16	.19	.30
Galvanized, each	.05	.05	.07	.11	.15	.25	.30	.45

Locknuts.—Fig. 199

Size	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Plain, each	.02	.03	.04	.05	.07	.09	.11	.18	.40	.50
Galvanized, each	.03	.04	.05	.07	.10	.14	.20	.30	.55	.70

(Continued on following page.)

MALLEABLE FITTINGS (Continued).

Bushings.—Fig. 200

Size	3⁄8	1⁄2	3⁄4	1	1¼	1½	2	2½
Plain, each	.04	.04	.05	.06	.07	.09	.14	.21
Galvanized, each	.08	.08	.10	.12	.14	.18	.28	.42

Faced Bushings.—Fig. 201

Size	3⁄4	1	1¼	1½	2	2½
Plain, each	.11	.13	.17	.22	.32	.48

Reducing Couplings.—Fig. 202

Size	¼	3⁄8	1⁄2	¾	1	1¼	1½	2	2½	3	3½	4
Plain, each	.03	.03	.05	.10	.16	.20	.28	.45	.70	1.00	1.50	1.85
Galvanized, each	..	.05	.08	.15	.25	.35	.45	.75	1.05	1.65	2.40	3.05

Enameled Fittings same list as Galvanized.

WROUGHT-IRON COUPLINGS.

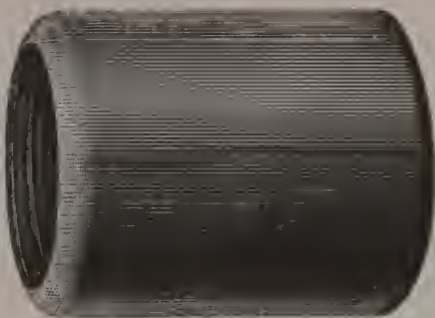


Figure 203.

Wrought-Iron Couplings.—Fig. 203.

Size	1⁄8	1⁄4	3⁄8	1⁄2	3⁄4	1	1¼	1½	2	2½	3
Plain, each	.05	.05	.06	.07	.10	.13	.17	.21	.28	.40	.60
Galvanized each	..	.06	.08	.10	.13	.18	.25	.32	.40	.55	.80
Size	3½	4	4½	5	6	7	8	9	10	12	
Plain, each	.80	1.00	1.50	1.65	2.40	3.25	4.25	5.50	7.50	10.00	
Galvanized, each	1.05	1.40	2.00	2.25	3.25	...	...	...	...	...	

PIPE HANGERS.



Figure 204.

Hanger Rolls, 2" and smaller.

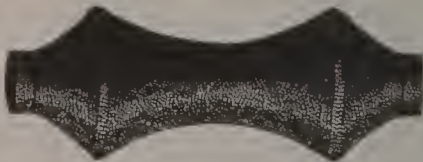


Figure 205.

Hanger Rolls, 2½" and larger.

Hanger Rolls—Fig. 204
2" and Smaller.

No. of pipes.....	1	2	3	4	5	6
For 1-in. pipe, 2½ in. centre to centre, each.....	.06	.12	.18	.24	.30	.36
For 1¼-in. pipe, 3 in. centre to centre, each.....	.07	.14	.21	.28	.35	.42
For 1½-in pipe, 3 in. centre to centre, each.....	.08	.16	.24	.32	.40	.48
For 2-in. pipe, 3¼ in. centre to centre, each....	.13	.26	.39	.52	.65	.78

Above prices for Rolls only, without Rods, Bolts or Flanges.

(Continued on opposite page.)

PIPE HANGERS (Continued).

Hanger Rolls.—Fig. 205

2½" and Larger.

Size	2½	3	3½	4	4½	5	6	7	8	10	12	14
Length end to end.....	4¾	4¾	5½	5½	6	6	7¾	8	9	11½	14	17½
Weight	2	2	3½	3½	4	4	4½	6	7¼	12	17½	22
Each	.15	.18	.21	.21	.24	.24	.27	.36	.44	.72	1.05	1.32

Malleable Pipe Rings.

Size	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Weight per 100..	9¼	15¾	18	28	35	39	49½	71	84½	91	100	..	..	..
Each	.02	.03	.03	.04	.05	.06	.08	.12	.15	.20	.25	.40	.50	.60

7 and 8 inch Wrought Iron.

Coil Stands.—Fig. 206

For 1" Pipe.



Figure 206.
Coil Stand.

No. pipes	4	6	8	10	12
Weight per pair.....	5	7	9	10	16½
Per pair	.30	.42	.54	.60	1.00

HOOK PLATES.



Figure 207.

Short Shank Hook.



Figure 208.

Expansion Hook.



Figure 209.

Ring Hook.



Figure 210.

Beam Hook.

Hooks.—Figs. 207, 208, 209 and 210

Size pipe	½	¾	1	1¼	1½	2	2½	3
Fig. 207, Short shank hooks.....	..	.08	.09	.10	.15	.22	..	..
Fig. 208, Expansion hooks.....	..	.12	.15	.17	.25	..	..	..
Fig. 209, Ring hooks.....	..	..	.16	.21	..	..	..	..
Fig. 210, Beam hooks.....	.10	.11	.13	.15	.18	.24	.45	.60

(Continued on following page.)

HOOK PLATES (Continued).



Figure 211.
Hook Plate.



Figure 212.
Offset Hook Plate.



Figure 213.
Expansion Plate.



Figure 214.
Ring Plate.

Hook Plates.—Figs. 211 to 214

Hook Plates.—Fig. 211

No. of hooks.....	2	3	4	5	6	7	8	9	10	12
For ¾ pipe, 2½ centre to centre....	.16	.21	.24	.28	.34	.40	.45	.50	.56	.72
For 1 pipe 2½ centre to centre.....	.18	.23	.26	.32	.38	.48	.59	.65	.70	1.00
For 1¼ pipe, 3 centre to centre.....	.21	.27	.32	.41	.52	.68	.80	.90	1.20	1.40
For 1½ pipe, 3 centre to centre.....	.28	.43	.58	.72	.88	1.10	1.25	1.40	1.55	1.90
For 2 pipe, 4½ centre to centre.....	.43	.65	.90	1.15	1.35	..	..	..	..	..

Offset Hook Plates.—Fig. 212

For 1¼ pipe, to offset 1½ inches....	.84	1.10	1.40	1.80	2.25	2.50	2.80	..	..	..
For 1¼ pipe, to offset 3 inches.....	1.10	1.70	1.95	2.25	2.50	2.80	3.35	..	..	..
For 1¼ pipe, to offset 4 inches.....	1.70	1.95	2.25	2.50	2.80	..	..	..	..	..

Expansion Hook Plates.—Fig. 213

For ¾ pipe, 2½ centre to centre....	.23	.34	.45	.55	.65	.77	.90	1.05	1.25	1.65
For 1 pipe, 2½ centre to centre....	.25	.35	.50	.60	.70	.80	.95	1.10	1.35	1.70
For 1¼ pipe, 3 centre to centre....	.27	.40	.60	.70	.80	.90	1.15	1.30	1.50	2.00
For 1½ pipe, 3 centre to centre....	.40	.60	.75	.90	1.00	..	..	..	..	..
For 2 pipe, 4½ centre to centre....	.60	.85	1.00	1.35	1.55	2.00	2.45	..	..	..

Ring Plates.—Fig 214

For 1 pipe, 2½ centre to centre....	.28	.41	.50	.62	.72	.96	1.00	1.20	1.30	..
For 1¼ pipe, 3 centre to centre....	.35	.50	.62	.75	1.10	1.25	1.40	..	..	..

PATENT CEILING PLATES.

In Halves.



Figure 215.

Inch	.....	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Each	.....	.22	.28	.32	.40	.50	.65	.90	1.00	1.20	2.00	2.50

FLOOR PLATES.

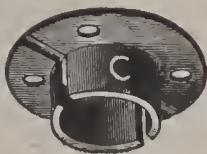


Figure 216.



Figure 217.

Inch	.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Each	.....	.06	.06	.08	.11	.14	.16	.24	.30	.35	.42	.60	.75

COMPRESSION HOSE BIBBS.



Figure 218.
For Lead Pipe.

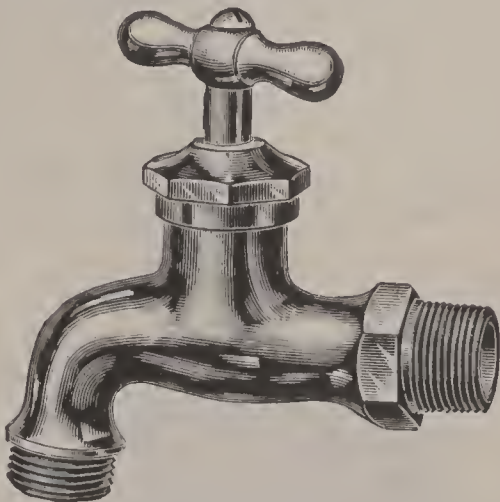


Figure 219.
For Iron Pipe.

Compression Hose Bibbs.—Fig. 218
For Lead Pipe.

Size	.....	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
Finished, per doz.	.....	12.00	13.00	15.00	20.00	37.00	56.00	86.00	170.00
Nickel plated, per doz.	.....	14.00	15.50	17.50	22.50	40.00	....	....	....

Compression Hose Bibbs.—Fig. 219
For Iron Pipe.

Size	.....	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
Finished, per doz.	.....	14.00	15.00	17.00	22.00	40.00	60.00	92.00	180.00
Nickel plated, per doz.	.....	16.00	17.50	19.50	24.50	43.00	....	....	....

AIR COCKS.

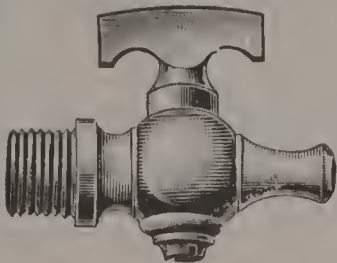


Figure 220.
Air Cock, T. H. and Shoulder.

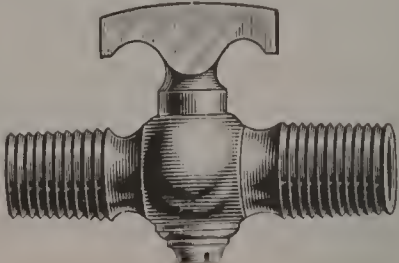


Figure 221.
Air Cock, Double End, T. H.

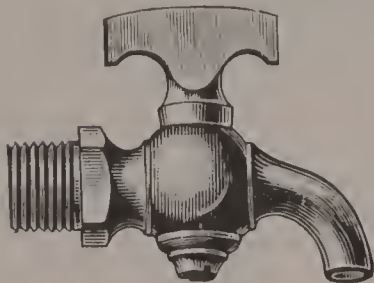


Figure 222.
Air Cock, Bibb Nose, T. H.

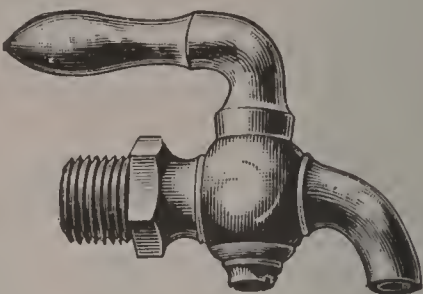


Figure 223.
Air Cock, Bibb Nose, L.H.

Price List.

Number	1	2	3	4
Size of blank shank, inch.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Size of shank pipe thread, inch.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Fig. 220, T. H. and shoulder air cock, each.....	.40	.50	.60	.80
Fig. 221, T. H. double end air cock, each.....	.50	.60	.70	1.00
Fig. 221, L. H. double end air cock, each.....	.60	.70	.80	1.10
Fig. 222, T. H. bibb nose air cock, each.....	.65	.75	.90	1.10
Fig. 223, L. H. bibb nose air cock, each.....	.75	.85	1.00	1.20
T. H. bibb nose air cock, hose end, each.....	.90	1.00	1.25	1.50
L. H. bibb nose air cock, hose end, each.....	1.00	1.10	1.35	1.75

STANDARD BRASS COCKS.

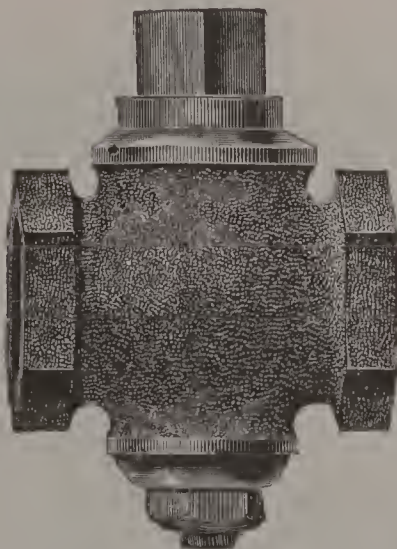


Figure 224.
Steam Cock, Square Head.

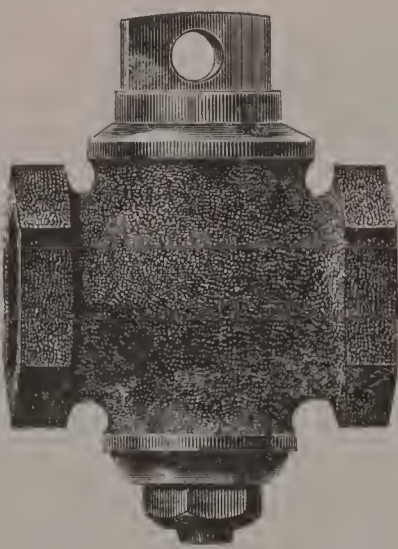


Figure 225.
Steam Cock, Flat Head.

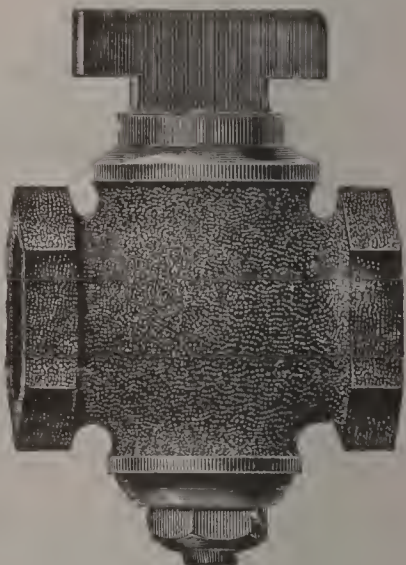


Figure 226.
Steam Cock, Tee Head.
Size $\frac{1}{4}$ to $\frac{1}{2}$ only.

Steam Cocks.—Figs. 224, 225, 226

Size	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Each	.85	.85	1.00	1.25	1.70	2.35	3.70	4.85	7.30	14.50	22.50	38.50	50.00

STANDARD BRASS COCKS (Continued).

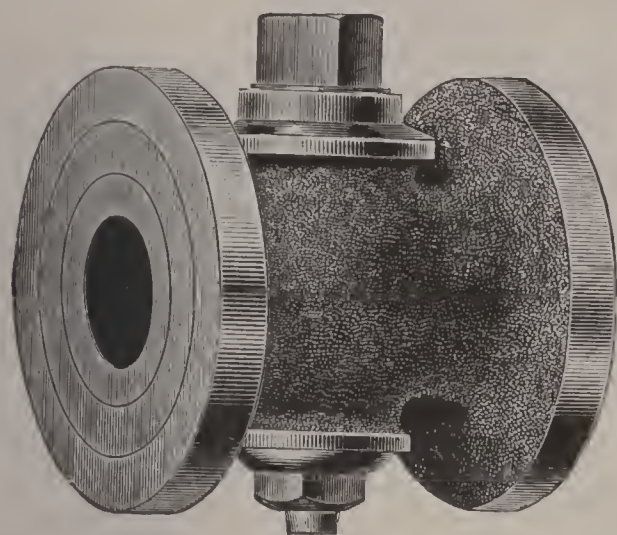


Figure 227.
Flanged Steam Cock.

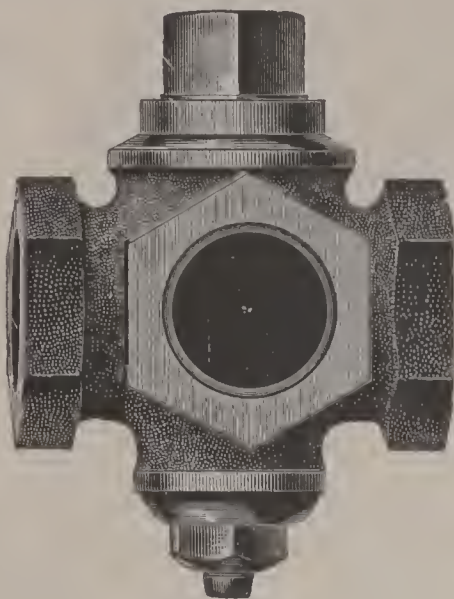


Figure 228.
Three-Way Cock.

Steam Cocks, Flanged.—Fig. 227

Size	1	1¼	1½	2	2½	3	3½	4
Diameter flanges	4	4½	5	6	7	7½	8½	9
Face to face.....	3⅜	3⅞	4⅝	5¼	6	8	8½	9
Each	7.30	9.70	11.75	18.00	27.50	43.00	62.00	84.00

Three-Way Cocks.—Fig. 228

Size	½	¾	1	1¼	1½	2	2½	3	3½	4
Each	2.50	3.00	3.75	5.75	7.15	11.00	18.75	26.00	50.00	70.00

STANDARD BRASS VALVES.

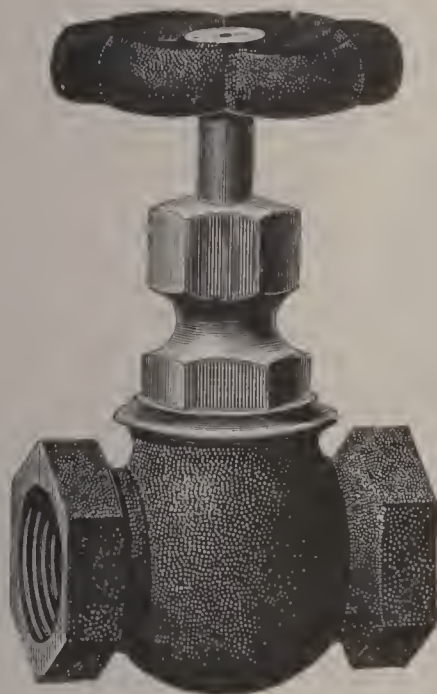


Figure 229.

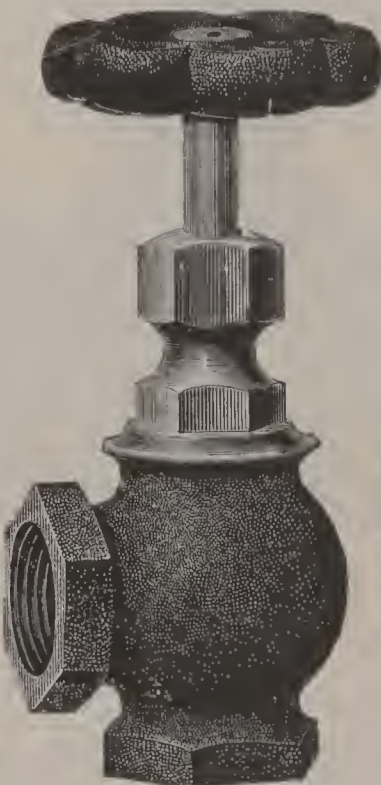


Figure 230.

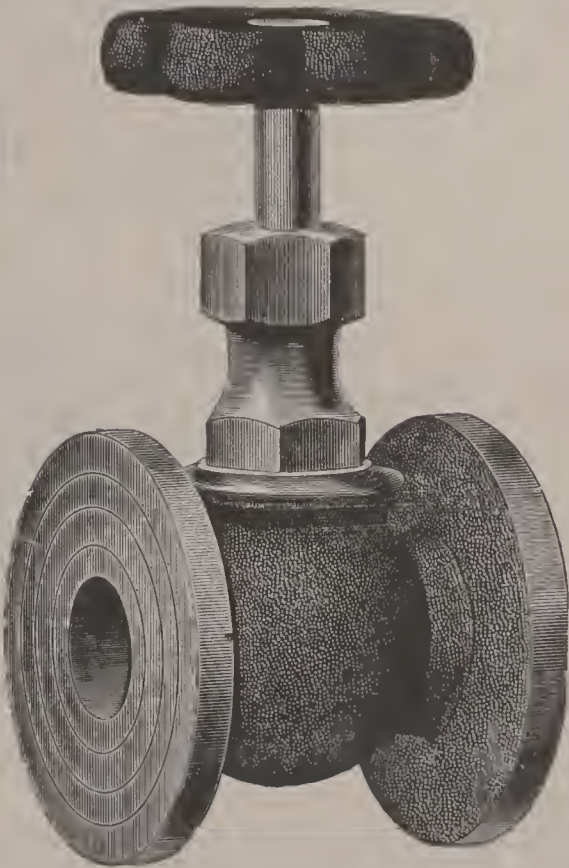


Figure 231.

Globe Valve, Screwed. Angle Valve, Screwed. Globe Valve, Flanged.

Globe and Angle Valves. Screwed.—Figs. 229, 230

Size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Each	.72	.72	.77	1.00	1.26	1.80	2.52	3.50	5.30	10.00	14.40	26.50	36.00

(Continued on following page.)

STANDARD BRASS VALVES (Continued).

Globe Valves. Flanged.—Fig. 231

Size	1	1¼	1½	2	2½	3	3½	4
Diameter of flanges	4	4½	5	6	7	7½	8½	9
Face to face	3 ⁷ / ₁₆	3 ¹³ / ₁₆	4 ⁵ / ₈	5 ³ / ₈	5 ¹⁵ / ₁₆	9 ⁹ / ₁₆	8¼	8 ⁷ / ₈
Each	6.75	8.50	10.50	16.00	23.00	35.00	50.00	70.00

Angle Valves.—Flanged.
Not Illustrated.

Size	1	1¼	1½	2	2½	3	3½	4
Diameter of flanges	4	4½	5	6	7	7½	8½	9
Centre to inlet	2 ⁹ / ₁₆	2¾	2 ¹⁵ / ₁₆	4	4½	5	5¼	6
Centre to outlet	2 ³ / ₈	2 ⁵ / ₈	3	3 ³ / ₈	4	4	4¼	5
Each	6.75	8.50	10.50	16.00	23.00	35.00	50.00	70.00

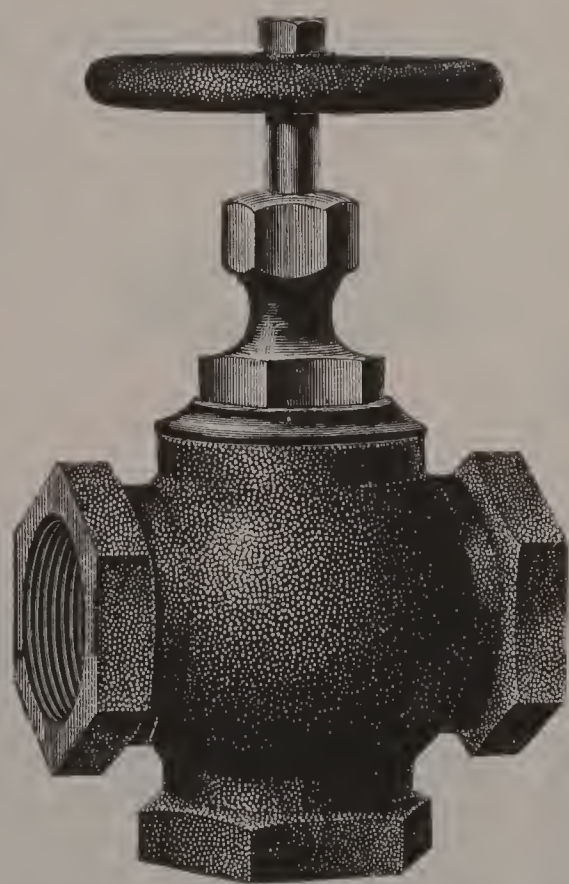


Figure 232.
Cross Valve.

Cross Valves.—Fig. 232

Size	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Each	1.25	1.25	1.50	2.00	2.50	3.50	5.00	8.00	16.00	24.00

Flanged Cross Valves to order

STANDARD BRASS VALVES (Continued).

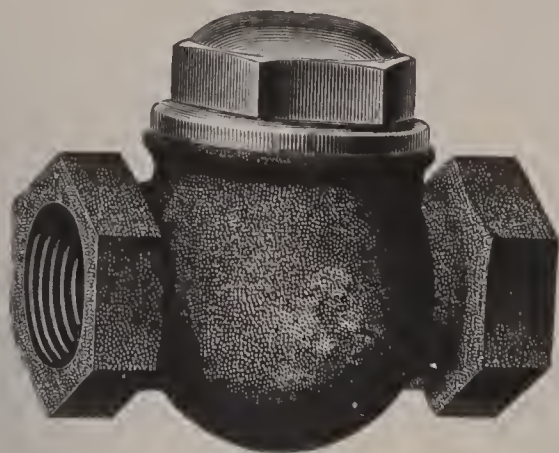


Figure 233.
Horizontal Check Valve.

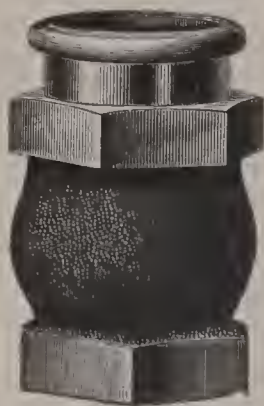


Figure 234.
Vertical Check Valve.

Horizontal Check Valves.—Fig. 233													
Size ...	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Each ...	.65	.65	.70	.90	1.15	1.60	2.25	3.15	4.75	9.00	13.00	24.00	32.50

Horizontal Check Valves.—Flanged								
Size	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Diameter of flanges	4	4 1/2	5	6	7	7 1/2	8 1/2	9
Face to face	3 7/8	3 13/16	4 5/8	5 3/8	5 15/16	6 9/16	8 1/4	8 7/8
Each	6.50	8.25	10.15	15.50	22.00	33.50	47.50	66.50

Vertical Check Valves.—Fig. 234													
Size	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	
Each	.72	.77	1.00	1.26	1.80	2.52	3.50	5.30	10.00	14.40	26.50	36.00	

JENKINS BROS.' VALVES.



Figure 235.



Figure 236.

- 1. Manufactured of the best steam metal.
- 2. No regrinding; therefore not constantly wearing out the seat of the valves.
- 3. Contain Jenkins Disc, which is suitable for all pressures of steam, oil and acids.
- 4. The easiest repaired, and all parts interchangeable.
- 5. Every valve tested before leaving the factory.
- 6. All genuine stamped with trade mark.

(Continued on following page.)

JENKINS BROS.' VALVES (Continued).

Size.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Brass Globe and Angle Valves, Screwed.....	1 10	1 25	1 60	2 20	2 80	4 00	5 50	8 75	15 75	22 00
“ “ “ “ Flanged.....	.....	.....	.....	.....	6 00	9 00	11 00	16 50	25 00	34 00
Brass Cross Valves, Screwed.....	1 70	2 00	2 25	2 50	3 25	4 75	6 25	9 50	20 00	27 50
“ “ “ “ Flanged.....	.....	.....	.....	.....	8 64	11 45	15 10	22 70	32 82	44 30

JENKINS BROS.' IRON BODY VALVES



Figure 237.

Have a wide and favorable reputation among engineers and steam users. They are extra heavy, contain the Jenkins Disc, and are easily repaired. All parts are interchangeable. They are fitted with brass hubs when specified, but unless otherwise ordered are fitted with yokes, as per cut. They are easy to repack, the yokes being large and with plenty of room. The flanged valves have the Master Steam Fitters' Standard, but can be fitted with other flanges if ordered.

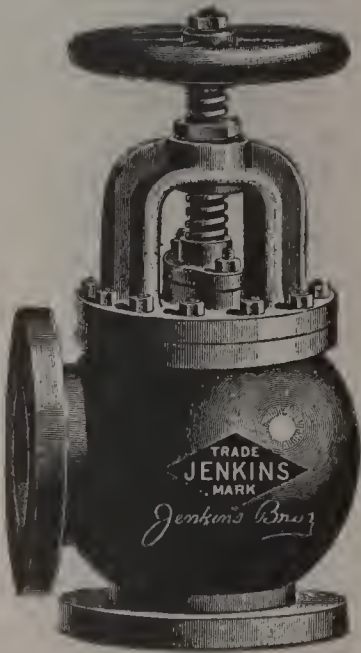


Figure 238.

Size	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12
Globe and Angle Valves:																
Brass Hub, Screwed...	2 75	2 85	3 85	5 00	7 25	11 00	16 00	.....	.....	.....	.....	.....	.....	.....	.....	.....
“ “ Flanged...	.....	.....	.....	.....	8 50	13 00	18 00	.....	.....	.....	.....	.....	.....	.....	130 00	.....
With Yoke, Screwed...	.....	.....	.....	.....	10 00	12 00	16 75	19 50	24 00	32 00	40 00	48 00	80 00	90 00	130 00	185 00
“ “ Flanged...	.....	.....	.....	.....	11 75	14 00	18 50	21 50	26 00	34 00	42 00	50 00	80 00	90 00	.....	185 00
Cross Valves, Screwed	.....	.....	.....	.....	.....	16 00	21 00	26 00	30 00	42 00	45 00	58 00	.....	.....	.....	.....
“ “ Flanged	.....	.....	.....	.....	.....	19 00	24 00	29 00	33 00	45 00	48 00	62 00	.....	.....	.....	.....



Figure 239.
Vertical.

JENKINS BROS.' CHECK VALVES.



Figure 240.
Horizontal.



Figure 241.
Angle.

BRASS.				
Size.....	¼	⅜	½	¾
Brass, Horizontal, Angle, and Vertical, screwed.	1.10	1.20	1.30	1.90
“ “ “ “ “ flanged.	.....	.....	.....	4.75
“ “ “ “ “ Swinging, screwed.....	.....	1.20	1.30	1.90
“ “ “ “ “ flanged.....	.....	.....	.....	5.50

(Continued on opposite page.)

JENKINS BROS.' CHECK VALVES (Continued).

Size.....	1¼	1½	2	2½	3
Brass, Horizontal, Angle, and Vertical, screwed.	3.60	5.00	7.50	13.50	20.50
“ “ “ “ flanged.	7.80	9.80	15.00	22.80	32.40
“ “ Swinging, screwed.....	3.60	5.00	7.50	13.50	20.50
“ “ “ flanged	7.80	9.80	15.00	22.80	32.40



Figure 242.
Horizontal, Screwed.



Figure 243.
Horizontal, Flanged.



Figure 244.
Angle, Flanged.

IRON BODY.

Size.....	2½	3	3½
Iron Body Check, screwed, horizontal, angle, and vertical	10.50	14.00	17.00
“ “ flanged, “ “ “	12.50	16.50	20.00
“ “ swinging, screwed.....	12.00	15.50	18.50
“ “ swinging, flanged.....	13.90	17.75	20.60

Size	4	5	6
Iron Body Check, screwed, horizontal, angle, and vertical	20.00	30.00	40.00
“ “ flanged “ “ “	23.00	33.00	43.00
“ “ swinging, screwed.....	22.75	32.90	43.75
“ “ swinging, flanged	25.45	36.10	47.10

IRON-BODY EXPANSION JOINTS.

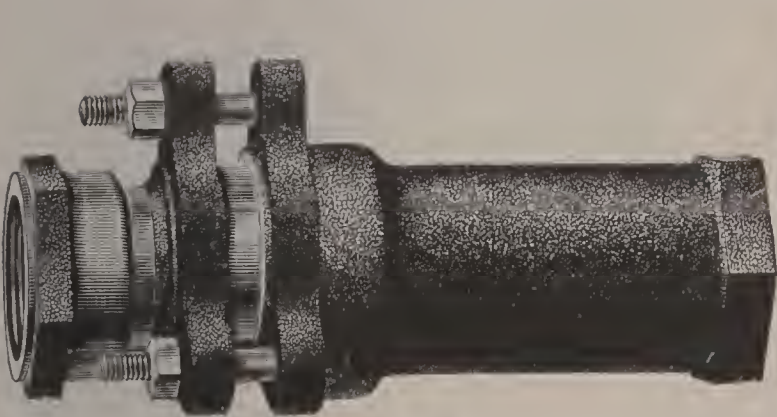


Figure 245.
Iron-Body Expansion Joint.

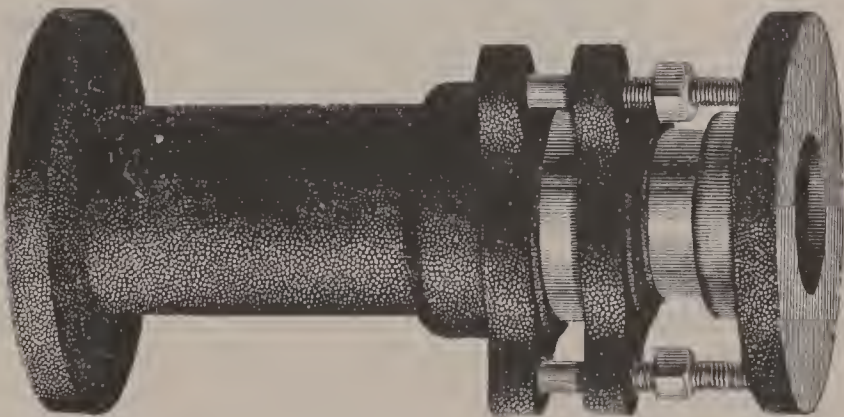


Figure 246.
Iron-Body Expansion Joint, Flanged.

Iron-Body Expansion Joints.—Figs. 245 and 246
6-inch Traverse.

Size	2½	3	3½	4	5	6
Traverse	6	6	6	6	6	6
Screwed	13.00	17.50	25.00	30.00	45.00	55.00
Flanged	20.00	25.00	35.00	40.00	55.00	65.00
Diameter flange	7	7½	8½	9	10	11

(Continued on following page.)

IRON BODY EXPANSION JOINTS (Continued).

Iron-Body Expansion Joints.—Figs. 245, 246

Western Traverse.

Size	2½	3	3½	4	5	6	7	8	10	12
Traverse	2½	2¾	3	3¼	4	5	6	7	7	8
Screwed	8.00	10.00	14.00	18.00	38.00	45.00	70.00	100.00	160.00	225.00
Flanged	16.00	18.50	25.00	30.00	48.00	55.00	80.00	110.00	175.00	250.00
Diameter flange	7	7½	8½	9	10	11	12½	13½	16	19

STANDARD IRON COCKS.

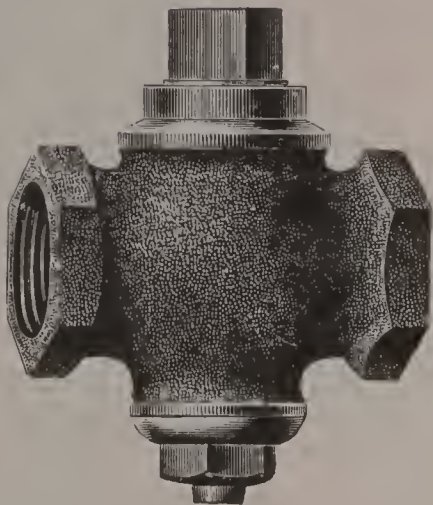


Figure 247.
Iron Cock.

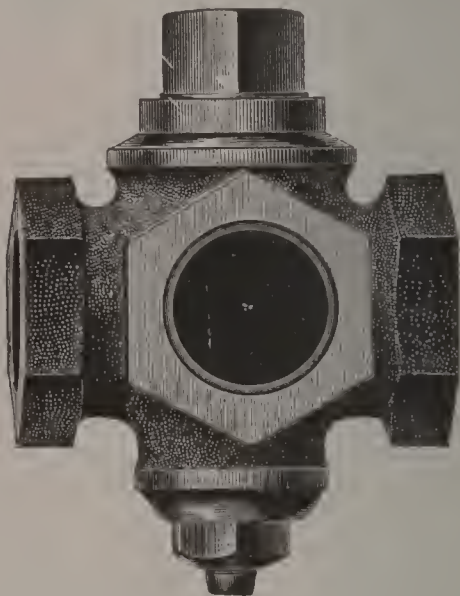


Figure 248.
Three-Way Cock.

Iron Cocks.—Screwed Ends.—Fig. 247

Size	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Standard pattern ..	.90	1.05	1.30	1.60	1.95	2.70	4.40	6.75	12.00	15.50	32.00	45.00
Heavy pattern	1.15	1.25	1.75	2.10	2.80	3.65	6.50	9.00	16.75	22.50	45.00	62.00
Standard pattern with brass plug..	1.30	1.60	1.90	2.65	3.75	5.25	8.75	13.00	27.50	36.50	67.00	94.00
Heavy pattern with brass plug..	1.70	2.25	2.80	3.85	5.60	7.00	13.25	19.00	42.00	56.00	98.00	133.00

Iron Cocks—Flanged Ends.

Size	1	1¼	1½	2	2½	3	3½	4	5	6
Standard pattern, each...	2.25	2.75	3.25	4.25	6.25	9.50	15.00	19.00	36.00	50.00
Heavy pattern, each.....	3.15	3.85	4.90	6.10	9.10	13.30	21.70	28.00	.....	.....
Standard pattern with brass plug	3.00	3.75	5.00	7.00	10.50	15.75	30.00	40.00	70.00	100.00
Heavy pattern with brass plug	4.20	5.60	7.70	9.45	16.10	23.10	46.90	61.60	.....	.....

(Continued on opposite page.)

STANDARD IRON COCKS (Continued).

Dimensions.—Iron Cocks, Flanged Ends.

Size	1	1¼	1½	2	2½	3	3½	4
Diameter flanges	3¾	4⅛	5	6	7	7½	8½	9
Face to face standard pattern.....	3¼	4	4¾	5	6¼	7¾	8¼	9¾
Face to face heavy pattern.....	4	4½	5½	6½	7½	8½	10	11

Three-Way Cocks.—Screwed Ends.—Fig. 248

Size	¾	1	1¼	1½	2	2½	3	3½	4
All iron, each	1.65	1.80	2.05	2.65	3.65	5.35	7.50	14.00	19.00
With brass plug, each	2.20	2.40	3.10	4.50	6.25	9.75	13.75	30.00	40.00

Extra for Brass Washers on all Above.

Size	½	¾	1	1¼	1½	2	2½	3	3½	4
Each	.10	.15	.25	.35	.40	.50	.75	1.00	2.00	3.50

SPECIAL IRON COCKS.

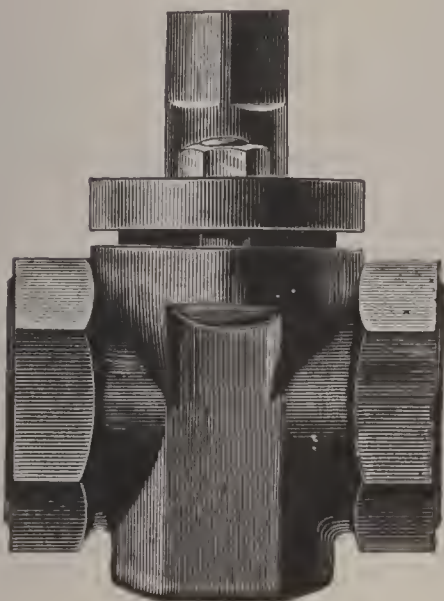


Figure 249.
Asbestos Packed Cock.

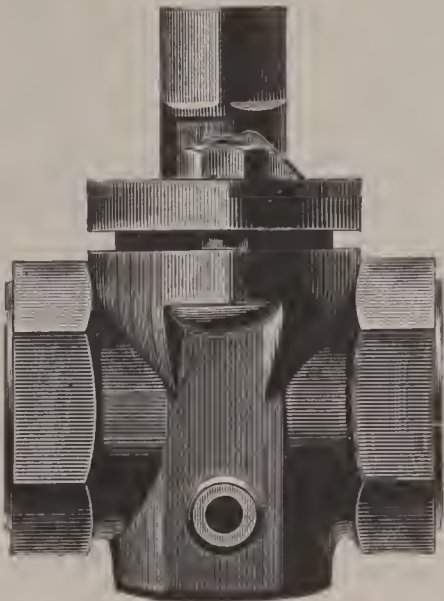


Figure 250.
Asbestos Packed Cock,
With Stop and Waste.

Asbestos Packed Iron Cocks.—Figs. 249 and 250

Size	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Screwed ends, each..	1.60	2.10	2.50	3.50	4.75	7.00	12.00	18.00	27.00	30.00	45.00	60.00
Flanged ends, each..	....	....	2.50	3.50	4.75	7.00	12.00	18.00	27.00	30.00	45.00	60.00

Asbestos Packed Brass Cocks.

Size	¼	¾	½	¾	1	1¼	1½	2	2½	3
Screwed ends, each.....	2.00	2.25	2.50	3.15	4.20	6.00	7.75	12.00	20.00	28.00

(Continued on following page.)

SPECIAL IRON COCKS (Continued).

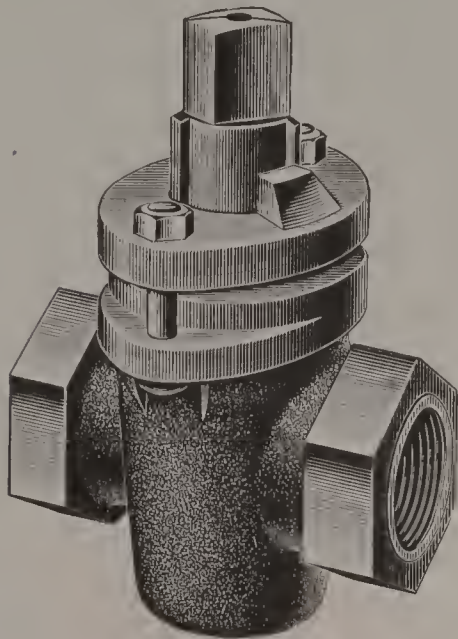


Figure 251.
Asbestos Packed Cock, Extra Heavy.

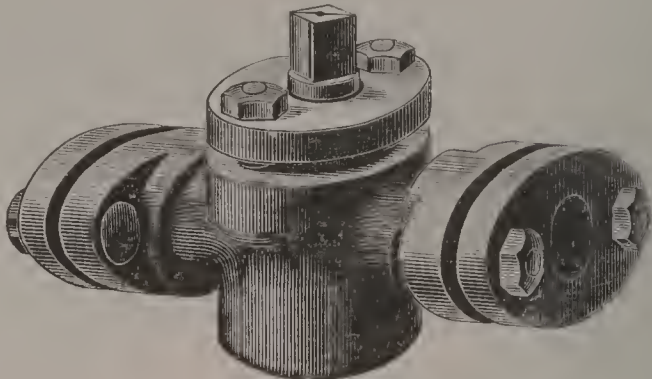


Figure 252.
With Gland.

Asbestos Packed Iron Cocks.—Fig. 251
Extra Heavy.

Size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
With screwed ends	2.40	3.00	3.50	4.75	7.00	12.00	18.00	27.00	30.00	45.00
With flanged ends .....	.....	.....	.....	.....	7.00	12.00	18.00	27.00	30.00	45.00

Asbestos Packed Cocks.—Fig. 252
With Gland for Ammonia.

Size	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5
Fig. 252	1.45	1.60	2.10	2.50	3.50	4.75	7.00	12.00	18.00	27.00	.....	.....	.....
Fig. 252, screwed ends.	1.30	1.45	1.60	2.10	2.50	3.50	4.75	7.00	12.00	18.00	27.00	30.00	45.00

STANDARD IRON-BODY VALVES.

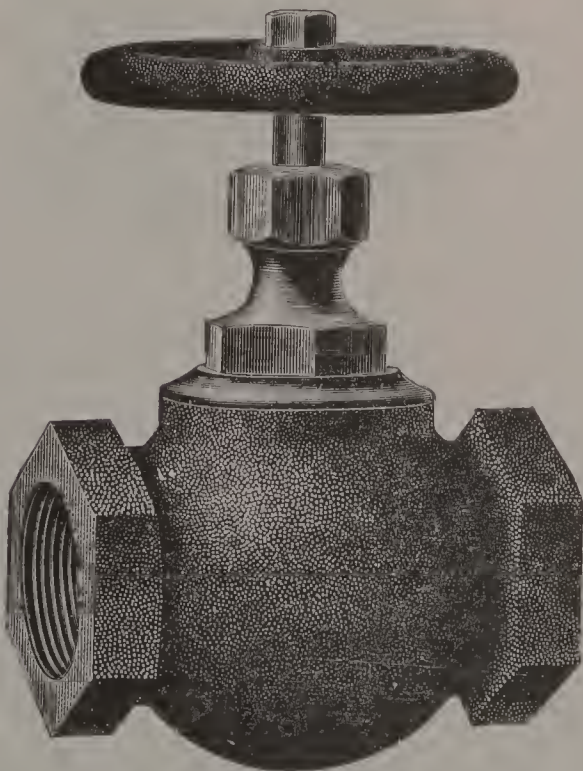


Figure 253.
Globe Valve.

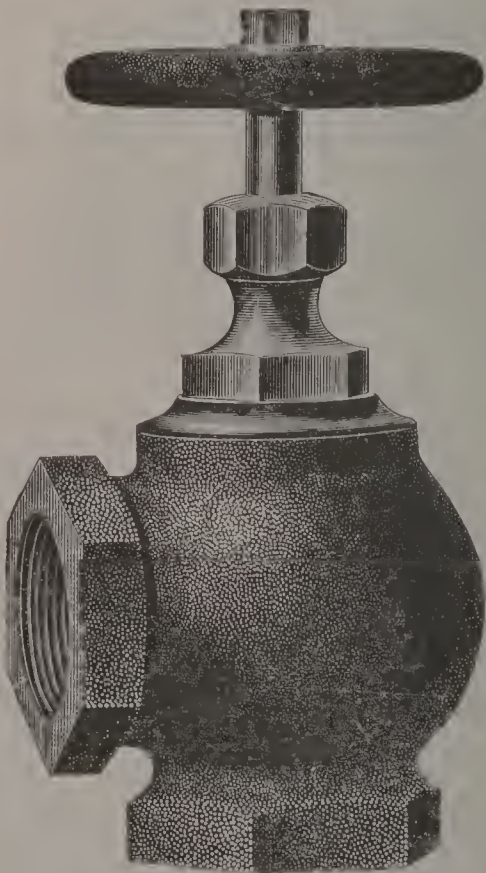


Figure 254.
Angle Valve.

(Continued on opposite page.)

STANDARD IRON BODY VALVES (Continued).

Iron-Body Globe and Angle Valves.—Figs. 253 and 254

Plain Top, Screwed Ends.

Size	1	1¼	1½	2	2½	3
Each	2.25	2.75	3.50	5.40	7.35	9.80

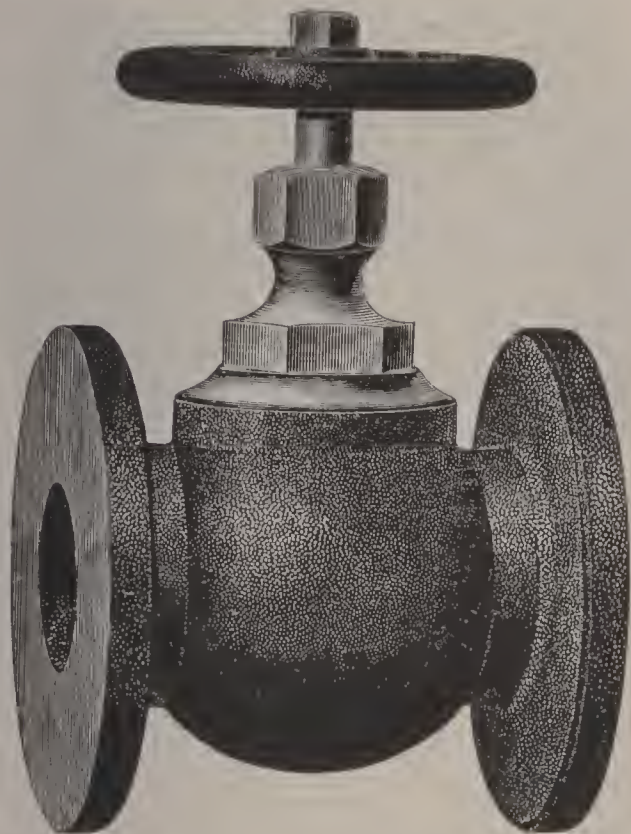


Figure 255.
Globe Valve, Flanged.

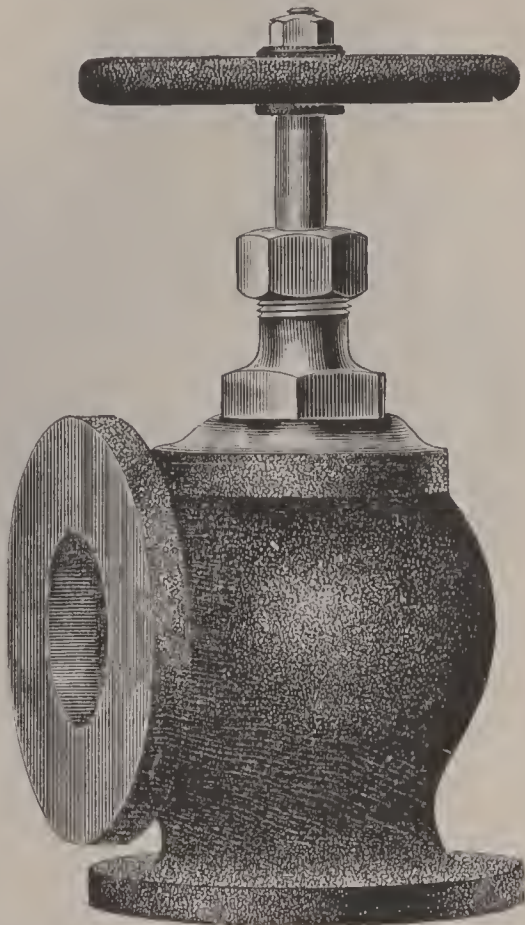


Figure 256.
Angle Valve, Flanged.

Iron-Body Globe and Angle Valves.—Figs. 255 and 256

Plain Top, Flanged Ends.

Size	1¼	1½	2	2½	3
Each	3.85	4.80	7.00	9.00	12.50

Dimensions.—Figs. 255 and 256

Size	2	2½	3
Diameter flanges	6	7	7½
Face to face, Fig. 255.....	6¼	7⅛	8
Centre to inlet, Fig. 256.....	4¼	4½	5
Centre to outlet, Fig. 256.....	3½	4	4

STANDARD IRON-BODY VALVES (Continued).

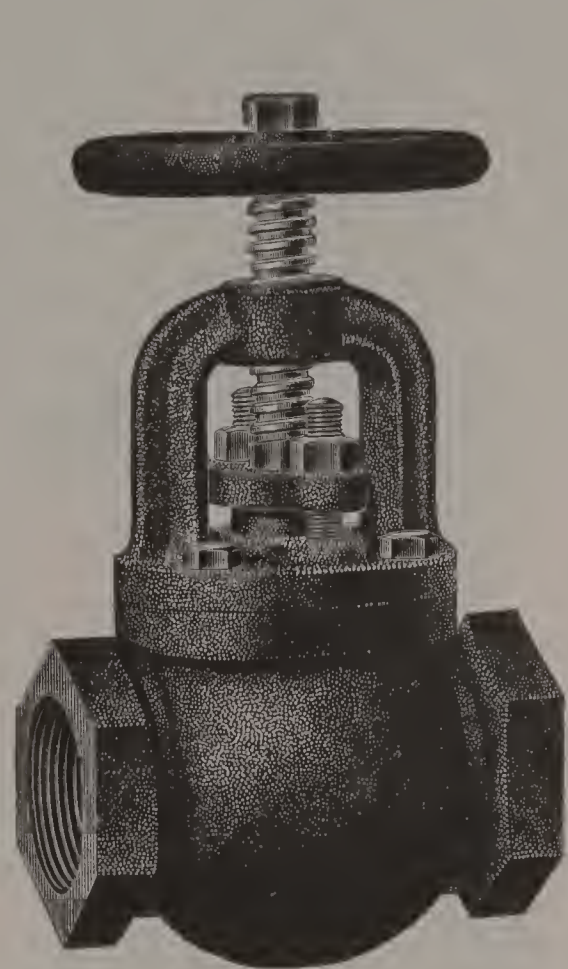


Figure 257.
Globe Valve, Screwed Ends.

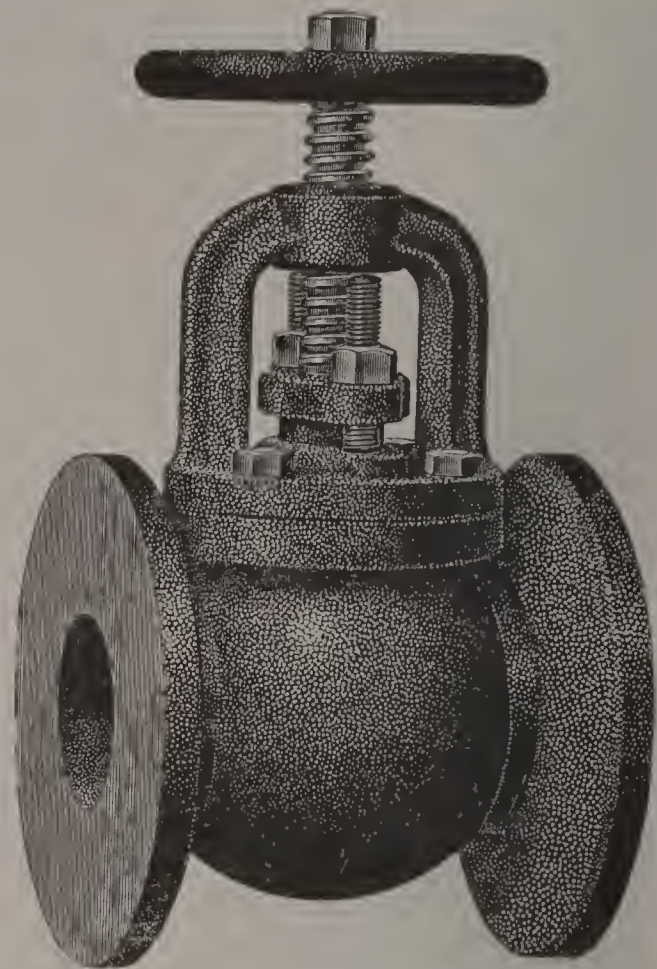


Figure 258.
Globe Valve, Flanged Ends.

Iron-Body Globe Valves, Screwed Ends.—Fig. 257
With Yoke Top.

Size	2	2½	3	3½	4	4½	5	6	7	8	10	12
Each	7.00	9.00	12.50	15.25	19.00	24.00	27.00	37.50	63.00	72.00	114.00	170.00

Iron-Body Globe Valves, Flanged Ends.—Fig. 258
With Yoke Top.

Size	2	2½	3	3½	4	4½	5	6	7	8	10	12
Diameter of flanges	6	7	7½	8½	9	9¼	10	11	12½	13½	16	19
Face to face.	6¼	7⅛	8	8⅜	9⅝	10	13	12⅞	14	16½	23	27½
Each	8.60	10.75	15.00	18.50	22.50	27.50	31.00	42.00	68.00	77.00	123.00	187.00

STANDARD IRON-BODY VALVES (Continued).

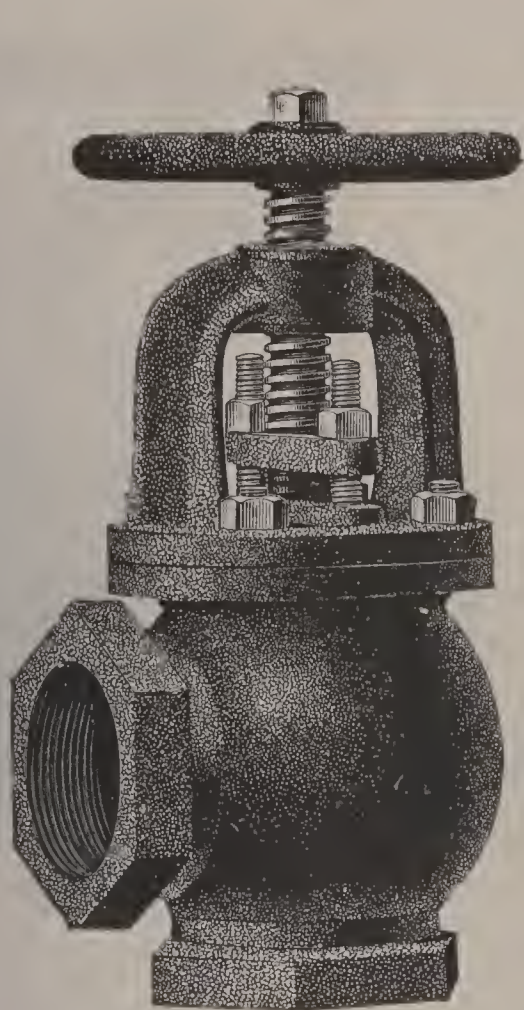


Figure 259.
Angle Valve, Screwed Ends.

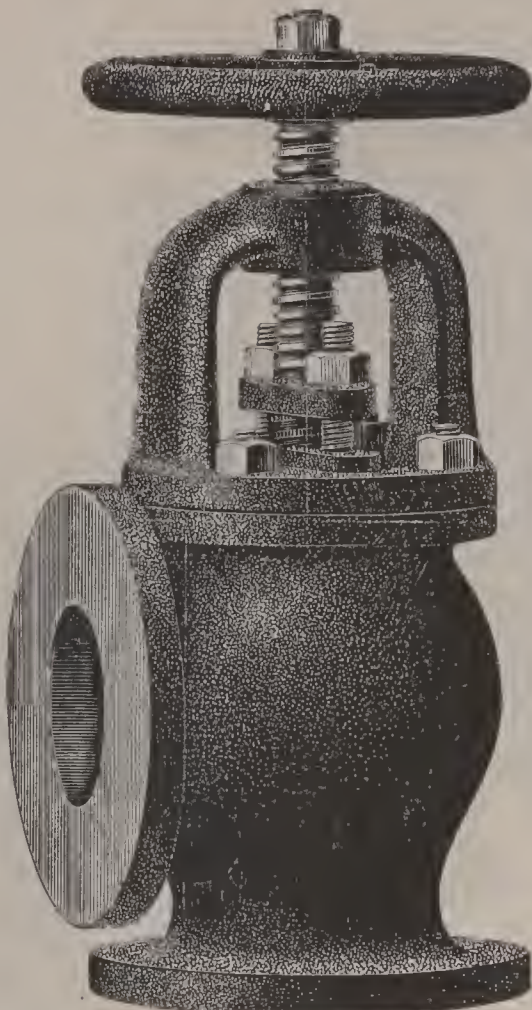


Figure 260.
Angle Valve, Flanged Ends.

Iron-Body Angle Valves.—Fig. 259
Screwed Ends, with Yoke Top.

Size	2	2½	3	3½	4	4½
Each.....	7.00	9.00	12.50	15.25	19.00	24.00
Size	5	6	7	8	10	12
Each.....	27.00	37.50	63.00	72.00	114.00	170.00

Iron-Body Angle Valves.—Fig. 260
Flanged Ends, with Yoke Top.

Size.....	2	2½	3	3½	4	4½
Diameter of Flanges ...	6	7	7½	8½	9	9¼
Centre to Inlet	4¼	4½	5	5¼	6	6
Centre to Outlet	3½	4	4	4¼	5	5
Each	8.60	10.75	15.00	18.50	22.50	27.50
Size	5	6	7	8	10	12
Diameter of Flanges.....	10	11	12½	13½	16	19
Centre to Inlet	6½	7	8½	9	10	13½
Centre to Outlet	5½	6½	8	8½	9½	13½
Each.....	31.00	42.00	68.00	77.00	123.00	187.00

STANDARD IRON-BODY VALVES (Continued).

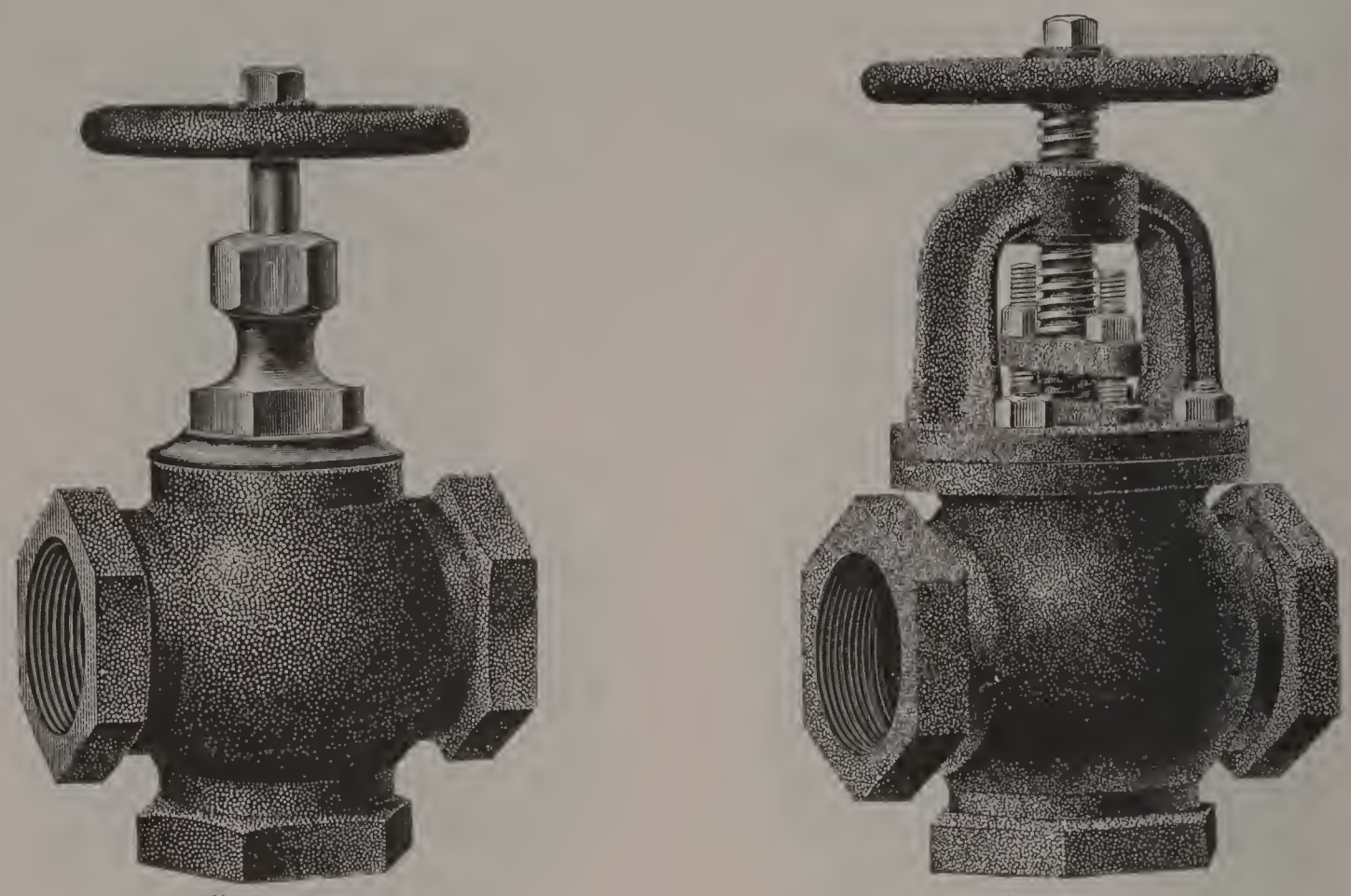


Figure 261.
Cross Valve, Plain Top.

Figure 262.
Cross Valve, With Yoke.

Iron-Body Cross Valves.—Fig. 261
Plain Top.

Size	2	2½	3
Each	6.50	9.00	12.50

Iron-Body Cross Valves.—Fig. 262
With Yoke Top.

Size	2	2½	3	3½	4	4½	5	6	7	8	10	12
Each	8.50	11.75	16.25	20.00	23.50	30.65	35.25	47.25	78.00	92.00	162.00	240.00

Iron-Body Cross Valves, Flanged Ends.

Size	2	2½	3	3½	4	4½
Diameter flanges	6	7	7½	8½	9	9¼
Centre to inlet	4¼	4½	5	5¼	6	6
Centre to outlet	3½	4	4	4¼	5	5
With plain top, each	9.00	11.75	16.50	.....	.....	.....
With yoke top, each	11.00	14.50	20.00	25.00	28.50	36.00
Size	5	6	7	8	10	12
Diameter flanges	10	11	12½	13½	16	19
Centre to inlet	6½	7	8½	9	10	13½
Centre to outlet	5½	6½	8	8½	9½	13½
With yoke top, each	41.00	54.00	85.00	100.00	175.00	265.00

STANDARD IRON-BODY VALVES.

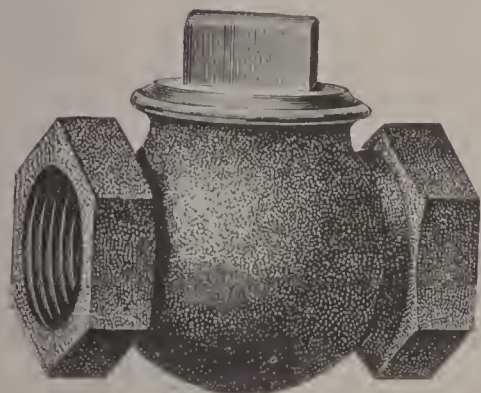


Figure 263.

Horizontal Check Valve,
Screwed Ends.



Figure 264.

Horizontal Check Valve,
Flanged Ends.

Iron-Body Check Valves.—Fig. 263

Screwed Ends.

Size	2	2½	3	3½	4	4½	5	6	7	8	10	12
Each	3.60	6.50	8.90	12.25	14.25	19.00	22.00	30.00	45.00	57.00	105.00	155.00

Iron-Body Check Valves.—Fig. 264

Flanged Ends.

Size	2	2½	3	3½	4	4½	5	6	7	8	10	12
Each	5.25	8.25	11.50	15.50	18.00	22.50	26.00	35.00	50.00	62.00	115.00	175.00

Dimensions of Horizontal Flanged Check Valves.—Fig. 264

Size	2	2½	3	3½	4	4½	5	6	7	8	10	12
Diameter of flanges ..	6	7	7½	8½	9	9¼	10	11	12½	13½	16	19
Face to face	6¼	7⅛	8	8¾	9⅝	10	13	12⅞	14	16½	23	27½

Note.—Iron-Body Check Valves, 3 inch and smaller, have brass caps; 3½ inch and larger, iron caps.

STANDARD IRON-BODY VALVES (Continued).

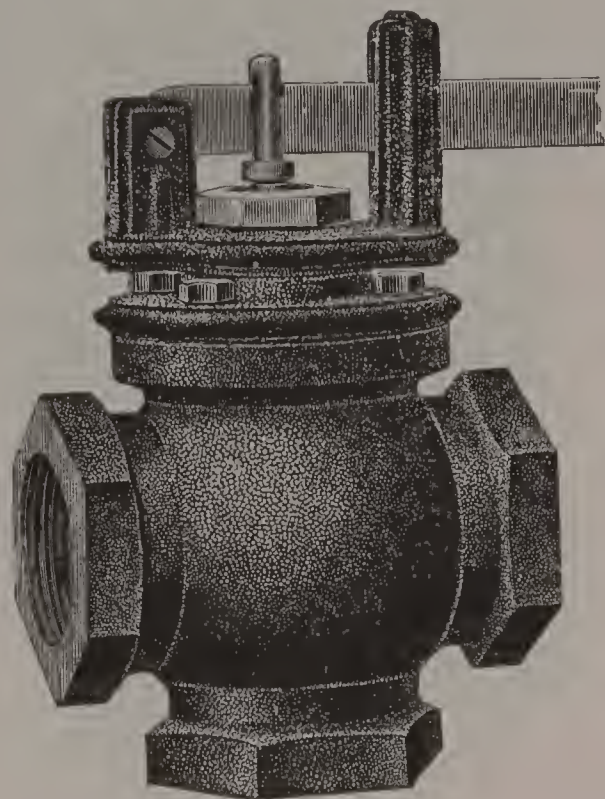


Figure 265.
Globe Safety Valve.

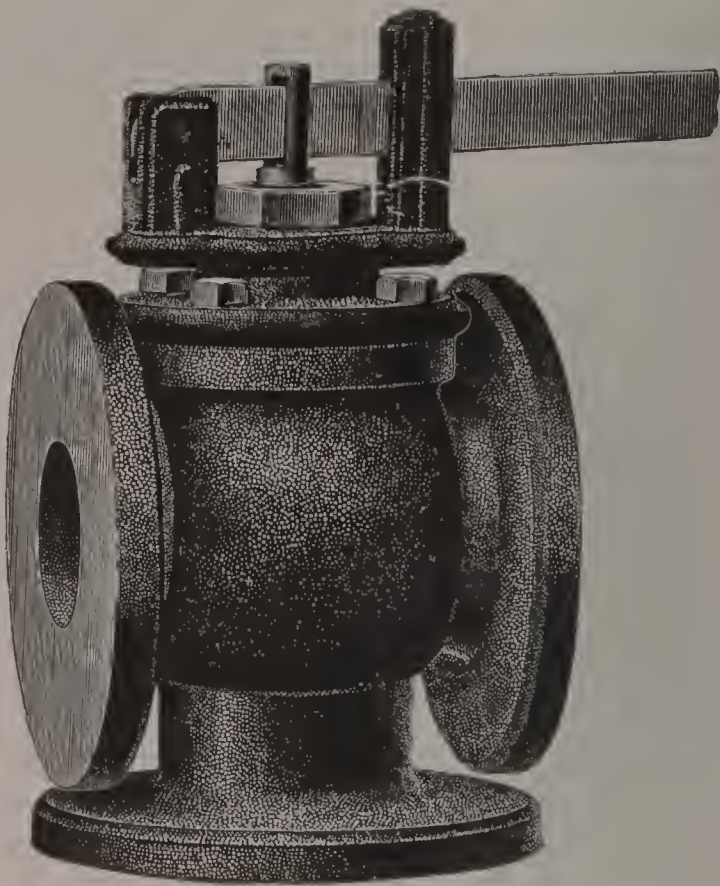


Figure 266.
Globe Safety Valve,
Flanged Ends.

Iron-Body Globe Safety Valves.—Fig. 265.
Screwed Ends.

Size	1¼	1½	2	2½	3	3½	4	4½	5	6
Each	5.00	5.80	7.80	13.25	17.25	23.00	28.75	34.50	41.50	57.75

Iron-Body Globe Safety Valves.—Fig. 266
Flanged Ends.

Size	2	2½	3	3½	4	4½	5	6
Diameter of flanges	6	7	7½	8½	9	9¼	10	11
Centre to inlet	4¼	4½	5	5¼	6	6	6½	7
Centre to outlet	3½	4	4	4¼	5	5	5½	6½
Each	10.25	16.00	21.50	27.50	34.00	40.00	48.00	65.00

Iron-Body Angle Safety Valves.
Screwed Ends.

Size	1¼	1½	2	2½	3	3½	4	4½	5	6
Each	5.00	5.80	7.80	13.25	17.25	23.00	28.75	34.50	41.50	57.75

Iron-Body Angle Safety Valves.
Flanged Ends.

Size	2	2½	3	3½	4	4½	5	6
Diameter of flanges	6	7	7½	8½	9	9¼	10	11
Centre to inlet	4¼	4½	5	5¼	6	6	6½	7
Centre to outlet	3½	4	4	4¼	5	5	5½	6½
Each	10.25	16.00	21.50	27.50	34.00	40.00	48.00	65.00

Safety Valves with bottom opening, flanged and side opening screwed, same list as flanged.
For Flanged Valves with flanges of larger diameter, add 25 per cent. to list.

STANDARD IRON-BODY VALVES (Continued).

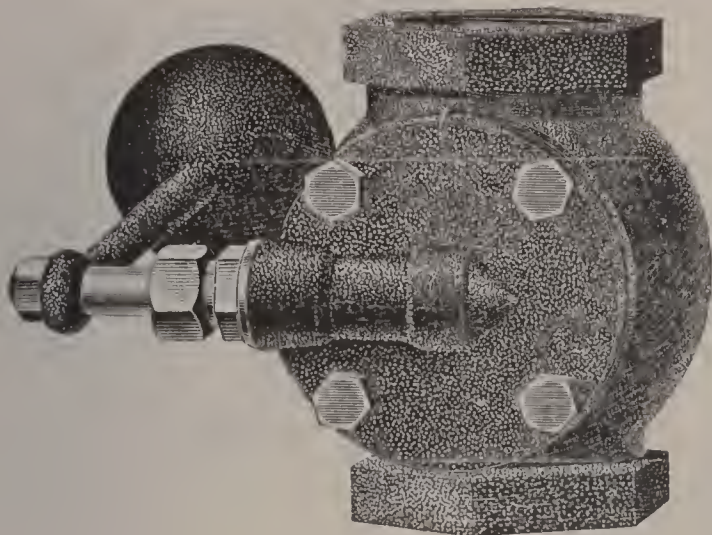


Figure 267.
Back Pressure Valve.

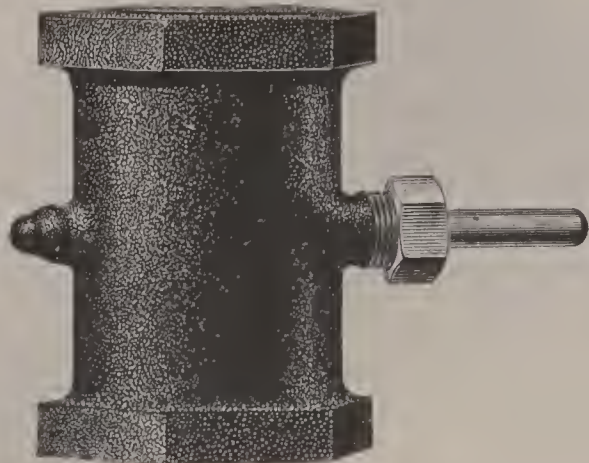


Figure 268.
Butterfly Valve.

Iron-Body Back Pressure Valves.—Fig. 267

Screwed Ends.											
Size	2	2½	3	3½	4	4½	5	6	7	8	10 12
Each	11.00	13.00	15.00	19.00	22.50	28.50	33.50	43.00	70.00	85.00	120.00 180.00

Iron-Body Back Pressure Valves.

Flanged Ends.											
Size	2½	3	3½	4	4½	5	6	7	8	10	12
Diameter flanges..	7	8	7½	9	9¼	10	11	12½	13½	16	19
Face to face	7⅞	8	8⅜	9⅝	10	13	12⅞	14	16½	23	27½
Each	15.00	17.50	22.00	26.00	32.00	37.00	47.00	75.00	90.00	130.00	200.00

Iron-Body Butterfly Valves.—Fig. 268

Screwed Ends.											
Size	1¼	1½	2	2½	3	3½	4	5	6		
Each	6.35	7.00	8.00	9.50	12.00	16.00	18.50	28.50	42.50		

Iron-Body Butterfly Valves.

Flanged Ends.						
Size	2½	3	3½	4	5	6
Diameter of flanges	7	7½	8½	9	10	11
Face to face	7	7½	8	8½	9¾	10½
Each	11.50	15.00	19.00	22.00	32.00	47.00

STANDARD IRON-BODY VALVES (Continued.)

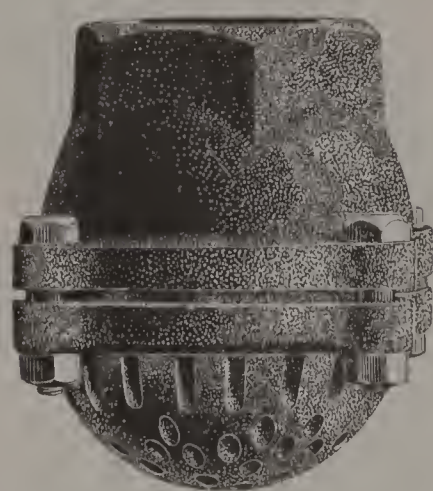


Figure 269.
Iron-Body Foot Valve.

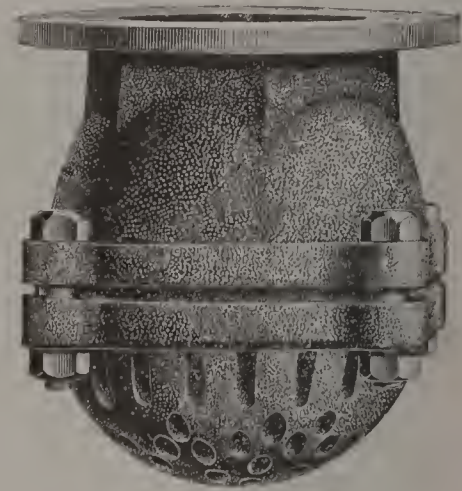


Figure 270.
Iron-Body Foot Valve.

Iron-Body Foot Valves.—Figs. 269 and 270

Size	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12
Fig. 269, each.....	.44	.52	.68	.90	1.30	1.85	2.60	2.80	4.25	7.00	16.00	29.00	41.00
Fig. 270, each.....	..	..	..	..	....	2.50	3.25	3.60	5.00	8.00	17.00	30.00	42.00
Fig. 269, galvanized	.60	.75	1.00	1.45	2.00	2.70	3.00	4.25	6.50	10.00	30.00	50.00	90.00
Fig. 270, galvanized	..	..	....	....	....	3.50	4.50	5.50	7.50	12.00	32.00	52.00	95.00

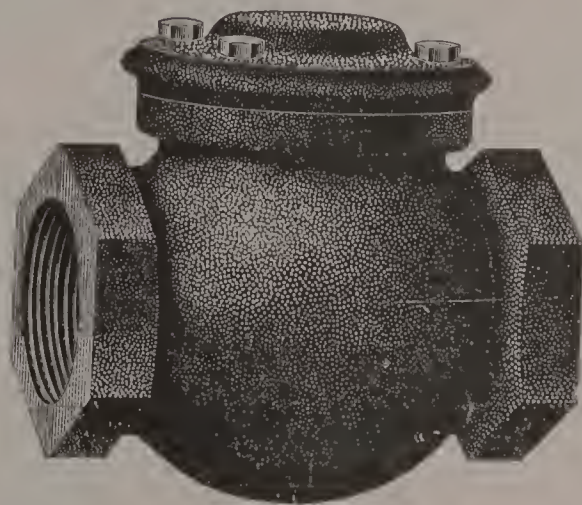


Figure 271.
Swing Check Valve.

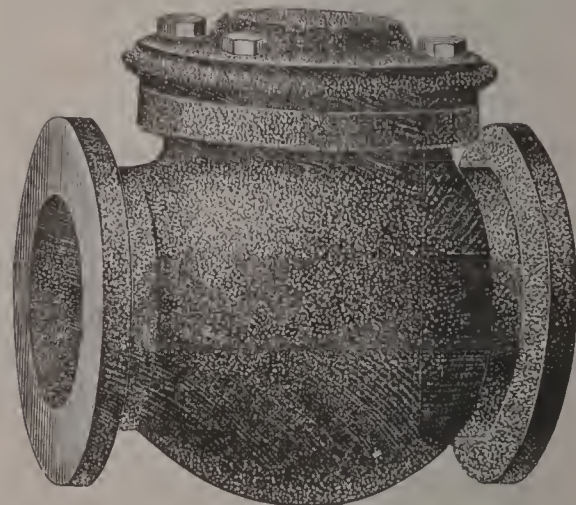


Figure 272.
Swing Check Valve.

Iron-Body Swing Check Valves.—Fig. 271

Brass Seat, Leather Disc, Screwed Ends.

Size	2½	3	3½	4	5	6
Each	10.00	12.00	16.00	18.00	25.00	32.00

Iron-Body Swing Check Valves.—Fig. 272

Brass Seat, Leather Disc, Flanged Ends.

Size	2½	3	3½	4	5	6
Diameter of flanges	7	7½	8½	9	10	11
Face to face	7⅞	8	8⅜	9⅝	13	12⅞
Each	10.00	12.00	16.00	18.00	25.00	32.00

IRON-BODY CHECK VALVES (Continued).

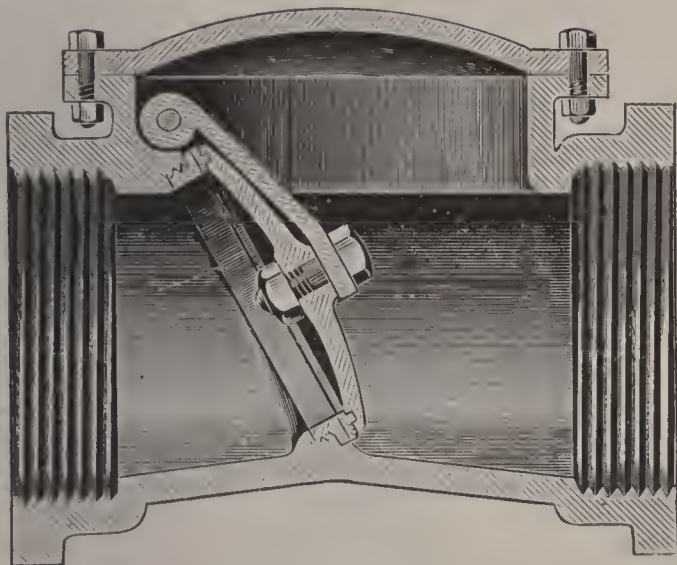


Figure 273.
Swing Check Valves.
Sizes 2½" to 16".

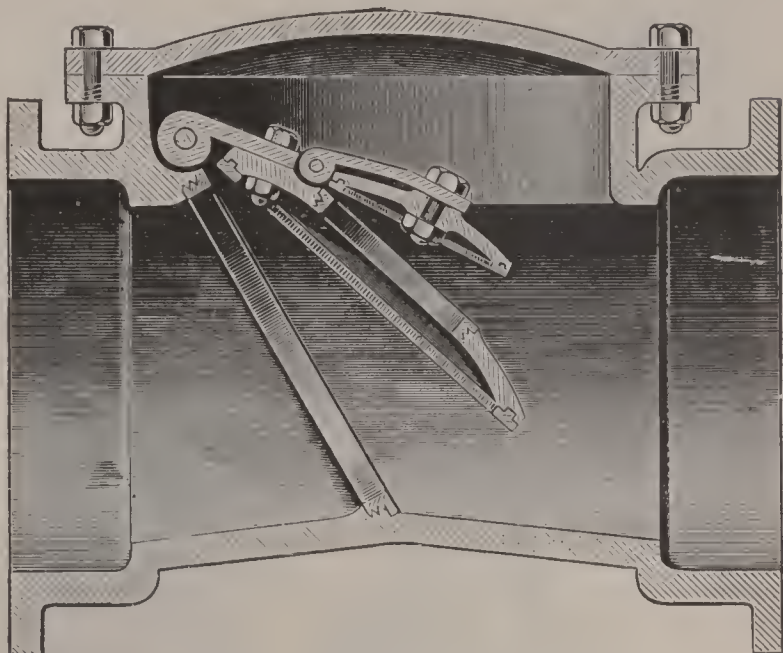


Figure 274.
Swing Check Valves.
Sizes 18" to 24".

Iron-Body Swing Check Valves.—Figs. 273 and 274

Size	2½	3	3½	4	4½	5	6	7
Screw ends	7.75	9.75	14.50	20.50	23.00	25.50	31.00	41.50
Flanged ends	8.75	11.00	15.50	21.50	24.00	27.00	32.50	43.00
Size	8	10	12	14	16	18	20	24
Screw ends	44.50	77.50	97.00	.....	.....	.....	.....	.....
Flanged ends	46.00	76.50	95.00	150.00	165.00	230.00	285.00	400.00

Figs. 273 and 274, 14 inch and larger, are with By-Pass.

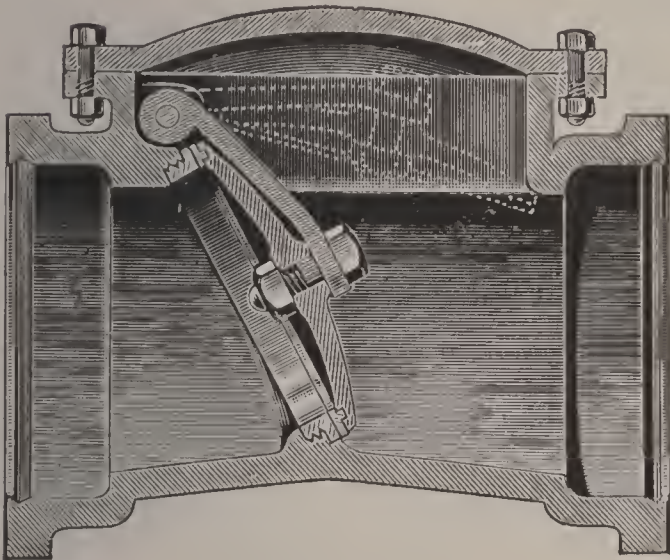


Figure 275.
16" and Smaller.

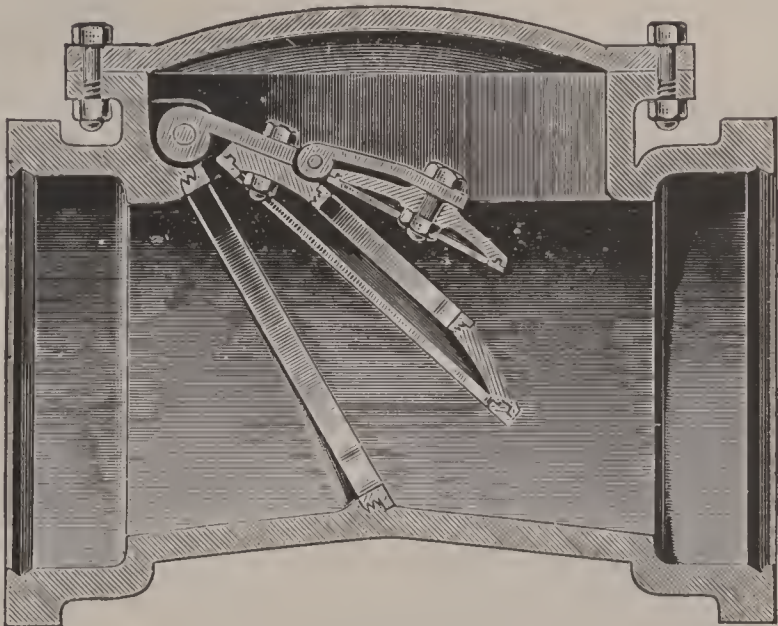


Figure 276.
18" and Larger.

Iron-Body Swing Check Valves.—Figs. 275 and 276

Size	3	4	6	8	10	12	14	16	18	20	24
Hub ends, each	10.25	20.50	28.50	43.00	73.00	92.00	146.00	160.00	225.00	280.00	390.00

Figs. 275 and 276 Check Valves, 14 inch and larger, are with By-Pass Valves.

Composition Standard Wedge Gate Valves.

WITH EITHER SCREW OR FLANGE ENDS. FOR STEAM OR WATER. BOTH STATIONARY AND RISING SPINDLES.



Figure 277.
Stationary Spindle

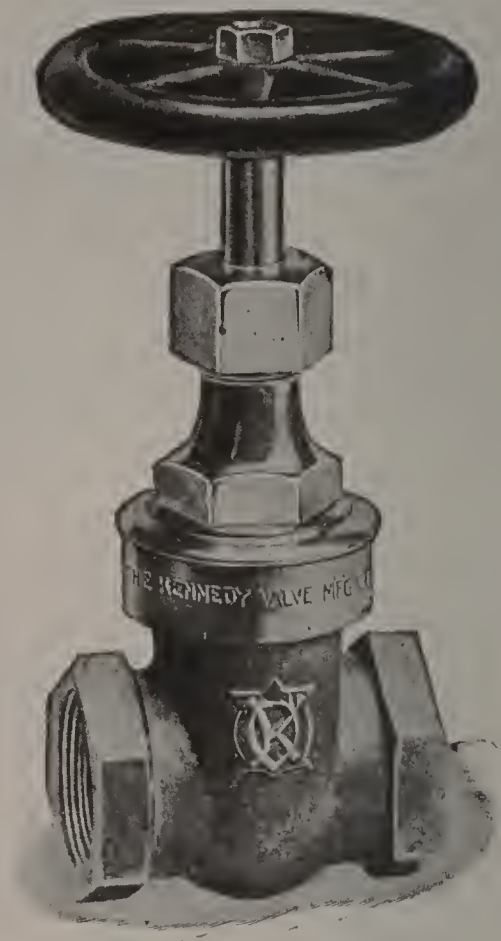


Figure 278.
Rising Spindle.

The gates or plugs of these Valves are constructed of one piece, guided in the body by ribs or splines, which take the strain, thus preventing contact till seated. These gates can easily be renewed should it become necessary, at a slight expense, all parts being interchangeable. Either end can be used for inlet or outlet.

Every Valve is thoroughly tested and inspected before leaving works.

Figures 277 and 278.

Diameter of opening, ins....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Face to face, screw ends....		$2\frac{1}{4}$	$2\frac{5}{8}$	3	$3\frac{1}{4}$	$3\frac{1}{2}$	$4\frac{1}{4}$	$4\frac{3}{4}$	$4\frac{7}{8}$	$5\frac{3}{4}$	6	7	
Face to face, flange ends....			3	3	$3\frac{1}{2}$	4	$4\frac{3}{4}$	$5\frac{1}{2}$	6	$6\frac{1}{4}$	7	8	9
Diameter of flanges.....		3	3	4	$4\frac{1}{2}$	5	6	$6\frac{1}{2}$	7	$7\frac{1}{2}$	9	10	11

PRICE LIST.

Diam. of opening, in..	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screw ends..	\$1 40	1 40	1 80	2 50	3 50	5 00	7 50	14 00	20 00	32 00	40 00	55 00	78 00
Flange ends..	2 50	2 75	3 50	4 50	5 50	7 50	12 00	18 00	25 00	40 00	48 00	66 00	94 00

Larger sizes to order. Prices on application.

Composition Wedge Gate Valves, Solid Bronze Seat,
Hose Ends.

WITH OR WITHOUT CAP AND CHAIN.

Unless otherwise ordered, New York standard thread will be cut on hose end.

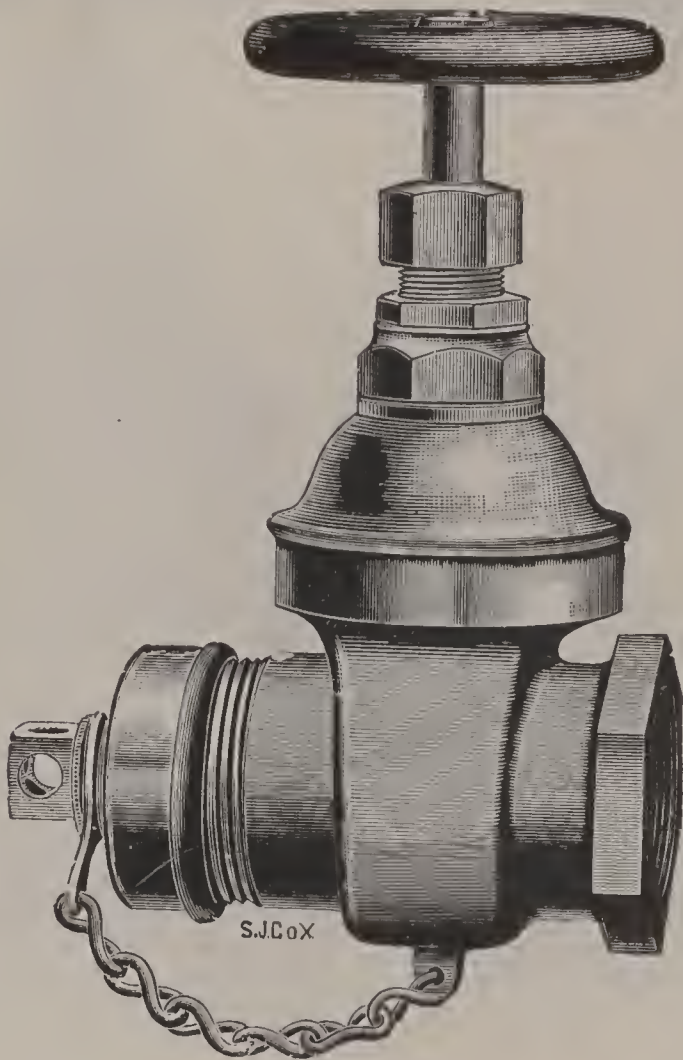


Figure 279.

Diameter of opening, inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Outside diameter thread on hose end	$1\frac{1}{16}$	$1\frac{5}{16}$	$1\frac{7}{8}$	$2\frac{1}{8}$	$2\frac{3}{4}$	3	.....
Diameter of bottom thread on hose end	$\frac{15}{16}$	$1\frac{3}{16}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	$2\frac{7}{8}$	.....
Number of threads per inch.....	11	11	11	11	11	8	.....

PRICE LIST.

Diameter of opening, inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Without cap or chain.....	\$1 75	2 25	3 25	4 25	6 25	11 50	16 00
Finished all over, brass wheel		4 00	5 00	6 00	8 25	18 00	25 00
Finished and nickel plated all over, brass wheel.....		4 50	5 50	6 50	9 00	19 00	26 00
Finished brass cap and chain, extra..	1 00	1 25	1 35	1 50	1 75	2 50	3 50

When other than New York standard thread is required send gauge or coupling.

Iron Body Composition Mounted Double Gate Valves.

STEAM AND WATER VALVES TO BEAR HEAVY PRESSURE
EITHER SIDE OF GATE.



Figure 280.



Figure 281.

The bodies, caps and wheels of these Valves are made of cast iron and composition stuffing boxes and spindles. The gates are also of cast iron, faced with best composition metal. The seats are of composition metal and firmly held to the body in a manner found by experience to be the best.

The larger sizes have bolted gland stuffing boxes.

Iron Body Composition Mounted Double Gate Valves.

BOLTED TOP. Figures 280 and 281.

Diameter of opening, inches	1½	2	2½	3	3½	4	4½	5	6	7
Face to face, screw ends...	4	5	6	6¼	6¾	7	7⅝	8	8⅝	10
Face to face, flange ends...	5¼	6	6⅛	7½	7½	8¼	8½	9⅛	9⅞	10⅝
Diameter of flanges.....	5	6	7	8	8½	9	9½	10	11	12
Diameter of opening, inches	8	9	10	12	14	15	16	18	20	24
Face to face, screw ends...	10¼	11½	11½	13¼						
Face to face, flange ends ..	11	11¾	12¼	13¼	14⅛		14⅛	15⅓	16	17¼
Diameter of flanges.....	13	15	16	18	21		23	25	27	31

(Continued on opposite page.)

Iron Body Composition Mounted Double Gate Valves
(Continued).

PRICE LIST.

Diameter of opening, inches.....	1½	2	2½	3	3½	4	4½	5	6	7
Screw ends.....		\$ 10 00	12 00	15 00	18 00	20 00	23 00	25 00	30 00	43 00
Flange ends.....		10 00	12 50	15 50	19 00	21 00	24 00	27 00	32 00	43 00
Diameter of opening, inches	8	9	10	12	14	15	16	18	20	24
Screw ends.....	53 00	60 00	70 00	95 00						
Flange ends... ..	53 00	60 00	70 00	95 00						
Diameter of opening, inches	1½	2	2½	3	3½	4	4½	5	6	7
Sliding stem and lever screw ends			\$ 16 00	20 00	22 00	25 00	28 00	30 00	35 00	48 00
Sliding stem and lever flange ends			16 00	20 00	22 50	25 00	28 50	32 00	37 00	48 00
Diameter of opening, inches.....	8	9	10	12	14	15	16	18	20	24
Sliding stem and lever screw ends	58 00	65 00	75 00	100 00						
Sliding stem and lever flange ends	58 00	65 00	75 00	100 00						

PUMP VALVES.

These valves are especially adapted for pumping hot water, syrups, beer, and other destructive fluids, also muddy and gritty water. When rubber valves have been found useless, these valves have given entire satisfaction.

For mining and high pressure service No. 88 Pump Valves are in use on 450 pounds pressure, and are giving entire satisfaction.

We also sell a fine grade of Rubber Valves for cold water and air service. When ordering valves, please state for what purpose you desire to use them.

PRICE, \$1.00 PER POUND.

In ordering Pump Valves, give Diameter, Thickness, and Size of Hole.

TO MANUFACTURERS OF VALVES AND THOSE USING VALVE DISCS.

We desire to call your attention to the new and improved Jenkins Discs, for valves, gauge-cocks, etc. Patented Oct. 5, 1880.

The Jenkins Discs will stand steam, oils, or acids. Soft Discs for cold water.

REVISED PRICE LIST OF JENKINS DISCS FOR VALVES.

Size.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Price	03	04	04	05	06	09	12	18	24	33	45	52
Size.....	4½	5	6	7	8	10	12	14	16	18	20	24
Price	60	68	90	98	1 20	1 75	2 25	3 00	4 00	5 00	6 00	9 00

Iron Body Water Gates, Composition Mounted, Bell or Spigot Ends (Continued).

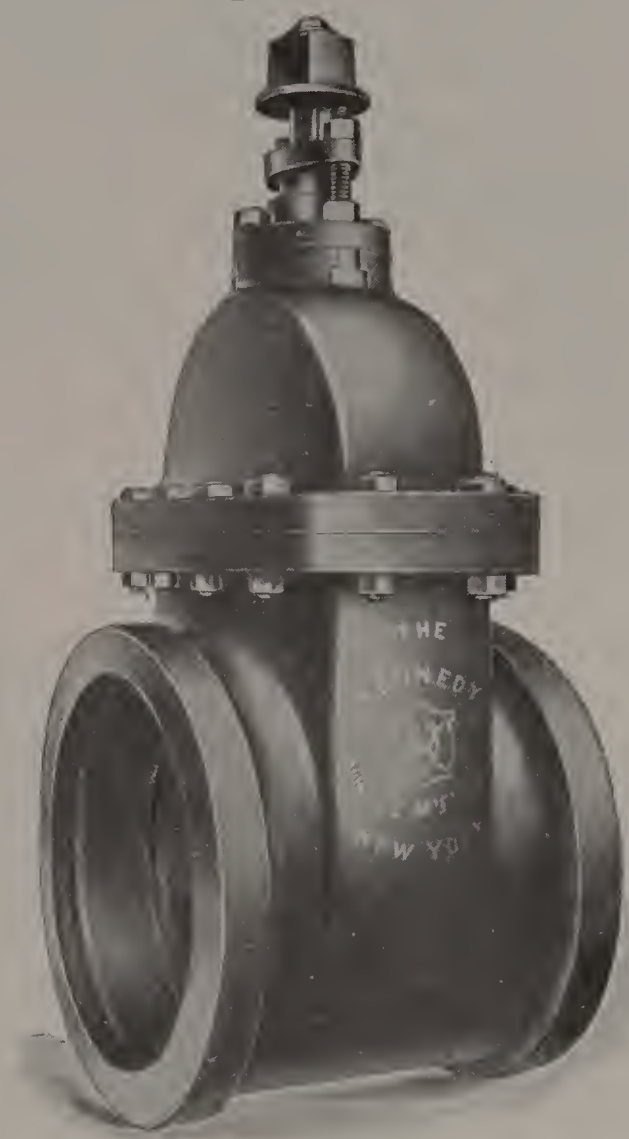


Figure 282.

These Valves are operated by a two-inch square nut on spindle, unless otherwise ordered.

The bodies, caps, nuts, stuffing boxes and glands are made of cast iron; the gates are also cast iron, faced with composition. The seats are of composition, firmly held to the body according to the most approved practice. The stems are large and strong, to prevent twisting, and of solid gun-metal composition, and are all interchangeable.

These Valves are specially constructed for street mains, and are extra strong to withstand rough usage.

Diameter of opening, inches.....	2	3	4	5	6	8	10	12	14	16	18	20	24
End to end of pipe when laid in bell	3	3¼	4	5	5	5¼	6	6¾	7¼	7½	8½	8¾	9½
Diameter of bell socket.	3⅞	4⅝	5¾	6⅞	7⅞	10	12	14¼	16¼	18½	20½	22¾	26¾

PRICE LIST.

Diameter of opening, inches.	2	3	4	5	6	8	10	12	14	16	18	20	24
Bell or spigot end.	\$10	15	20	25	30	53	70	95					

When ordering, state if Valves should open by turning to the left or to the right. When not otherwise mentioned, we send Valves which open by turning to the left.

These Valves will be furnished with Brass Stuffing Boxes on all sizes if required.

JENKINS STANDARD '96 PACKING.



Figure 283.

Jenkins '96 Packing, 80 cents per pound.

Westcott's Patent IXL Independent Lathe Chuck.

The Westcott Patent Independent Chuck. Made with Four Jaws.

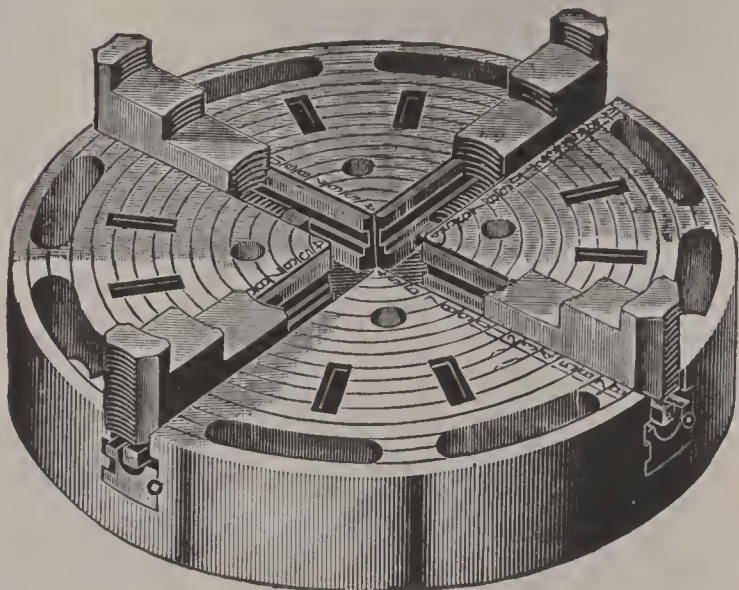
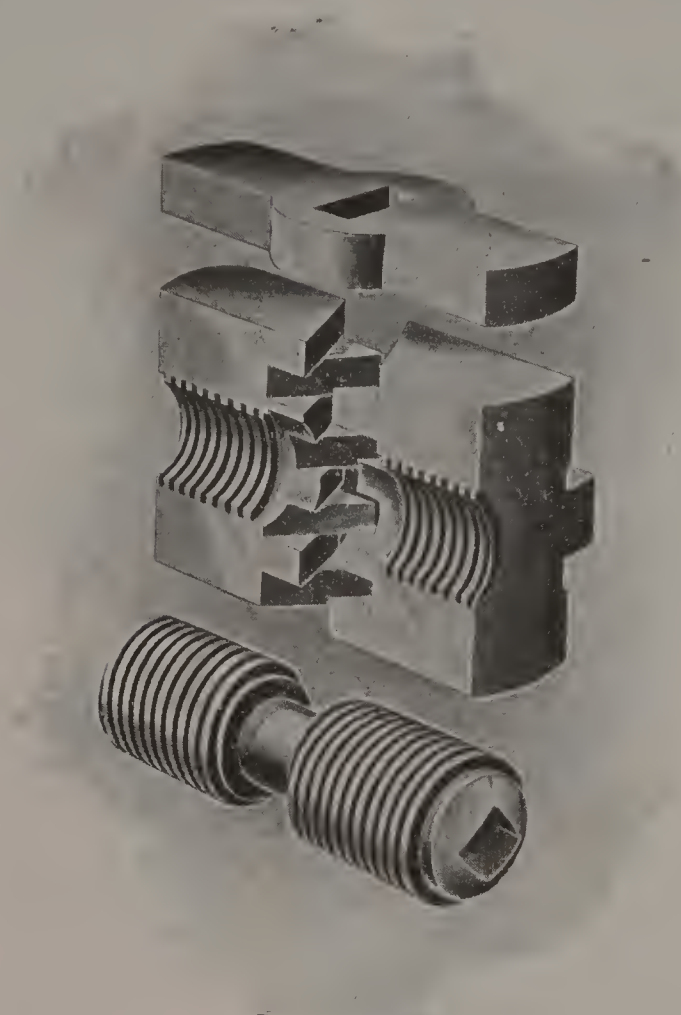


Figure 284.

PRICE LIST.

Diameter.	Capacity.	Approximate Weight.	Diameter of Center Hole.	Diameter of recess for face plate.	Price with 3 or 4 Jaws.	Unfinished face plate castings.
4 ⁹ / ₁₆ in.	5 ¹ / ₂ in.	14 lbs.	1 in.	3 ¹ / ₂ in.	\$ 14 00	\$ 0 25
6 "	6 ³ / ₄ "	22 "	1 ³ / ₄ "	5 ⁹ / ₁₆ "	18 00	75
8 "	9 "	39 "	1 ⁷ / ₈ "	4 ⁷ / ₁₆ "	22 00	50
10 ¹ / ₈ "	12 "	51 "	2 "	5 ¹ / ₂ "	26 00	75
13 ¹ / ₄ "	17 "	88 "	3 "	6 ¹ / ₂ "	32 00	1 00
16 "	20 "	139 "	3 "	7 ¹ / ₂ "	38 00	1 50
18 ¹ / ₂ "	23 "	180 "	4 "	8 "	44 00	2 00
21 ¹ / ₄ "	26 "	228 "	4 "	9 ¹ / ₂ "	55 00	3 00
24 "	30 "	241 "	4 ³ / ₄ "	10 "	65 00	3 00
30 "	36 "	447 "	6 "	12 ³ / ₄ "	120 00	4 00
36 "	43 "	650 "	7 ¹ / ₄ "	15 "	210 00	5 00

Three jawed I X L Independent Chucks above 13¹/₄ inches in diameter are made to order only.



Pratt's Patent Improved
Positive Driving
Drill Chucks.

List Nos.	Diameter.	Holding Drills.	Weight	Price Each.
1	2¼ in.	0 to ½"	2½ lbs	\$8 00
2	3 "	0 to ¾"	5½ "	9 00
3	3¾ "	0 to 1"	10 "	10 00
4	5 "	0 to 1½"	23½ "	20 00
5	6 "	0 to 2"	48 "	25 00

Figure 285.
Working Parts.

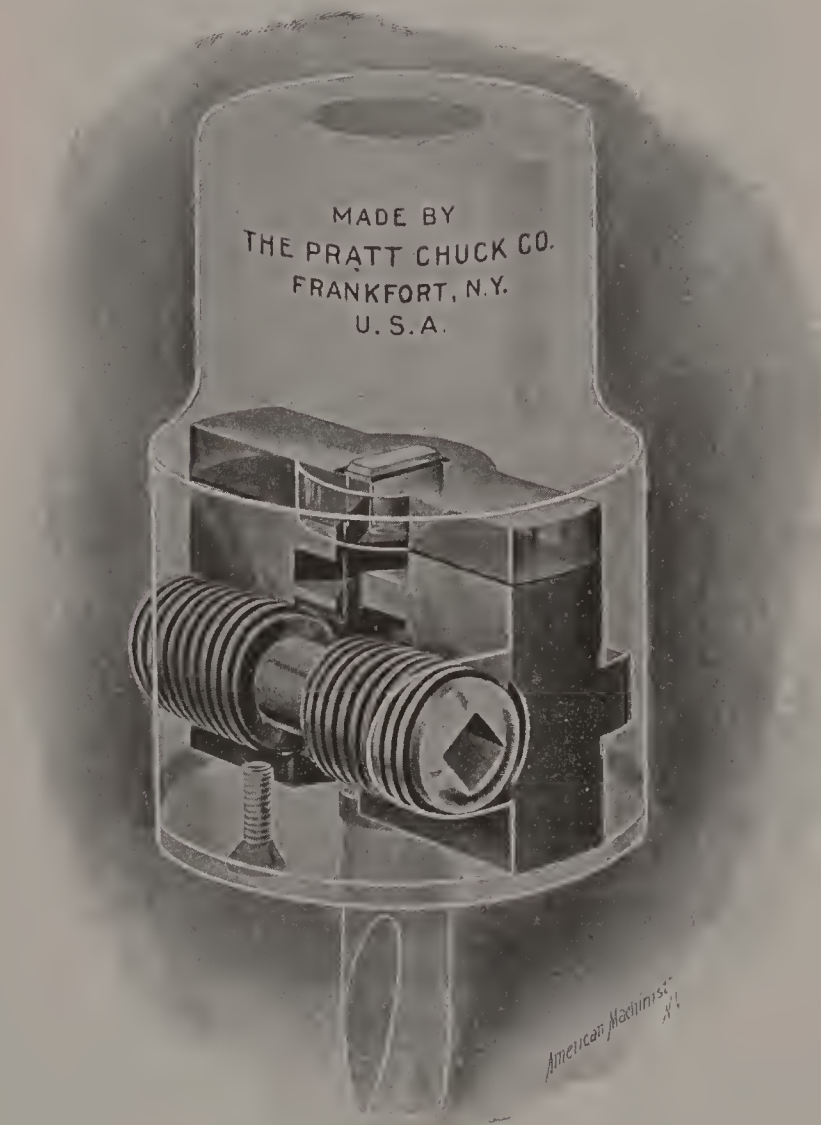


Figure 286.
X-Ray View.

Center Arbors and Taper Split Sleeves for Pratt's Chucks.

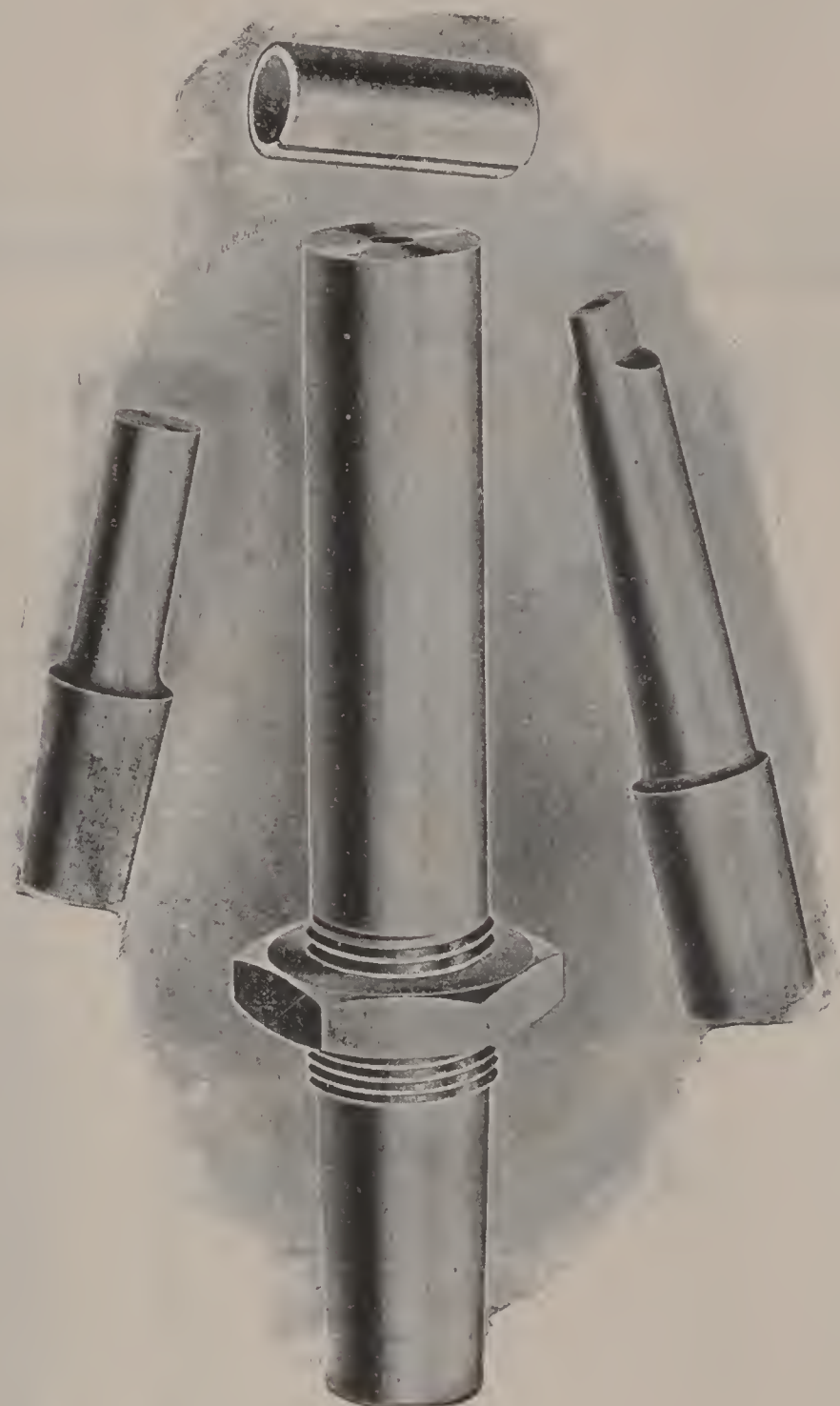


Figure 287.

Center Arbors for attaching chucks to lathes and drill presses.

No. 1.

Taper arbor for drill press made to order from dimensions furnished. Price according to size.

No. 2.

Arbor with nut, for forcing off chuck. Price, \$1.75 each.

No. 3.

Drill Press Arbor, 1/2 in., 5/8 in. and 3/4 in. shank for blacksmiths. Price, 50 cents each.

Taper Steel Split Sleeves for driving Taper Shank Drills.

One Sleeve for No. 1 Chuck, capacity, 1/4 to 1 1/2 in. Diameter.....	\$0.40
Two Sleeves for No. 2 Chuck, capacity, 1/4 to 2 1/2 in. diameter.....	0.80
Three Sleeves for No. 3 Chuck, capacity, 1/4 in. to 1 1/4 in. diameter.....	1.30
Four Sleeves for No. 4 Chuck, capacity, 1/4 in. to 2 in. diameter.....	2.30
Five Sleeves for No. 5 Chuck, capacity, 1/4 in. to 2 1/2 in. diameter.....	3.60

Above applies to Morse and Standard tapers.

PATENT INCREASE TWIST DRILLS.

WITH MORSE TAPER SHANKS.



Figure 288.

Diameter, Inches.	Price, Each.	Length, Inches.	Socket for Morse Taper	Diameter, Inches.	Price, Each.	Length, Inches.	Socket for Morse Taper.
$\frac{1}{8}$	\$0.45	$5\frac{1}{8}$	No. 1, \$1.20.	$1\frac{1}{32}$	\$5.00	$14\frac{3}{8}$	No. 4, \$4.00.
$\frac{5}{32}$	.45	$5\frac{3}{8}$		$1\frac{3}{8}$	5.20	$14\frac{1}{2}$	
$\frac{3}{16}$	.50	$5\frac{3}{4}$		$1\frac{1}{2}$	5.40	$14\frac{5}{8}$	
$\frac{7}{32}$	.55	6		$1\frac{5}{8}$	5.60	$14\frac{3}{4}$	
$\frac{1}{4}$	.60	$6\frac{1}{8}$		$1\frac{3}{2}$	5.80	$14\frac{7}{8}$	
$\frac{9}{32}$	.65	$6\frac{1}{4}$		$1\frac{1}{2}$	6.00	15	
$\frac{5}{16}$	.70	$6\frac{3}{8}$		$1\frac{3}{2}$	6.30	15	
$\frac{11}{32}$	.75	$6\frac{1}{2}$		$1\frac{9}{8}$	6.60	$15\frac{1}{4}$	
$\frac{3}{8}$	.80	$6\frac{3}{4}$		$1\frac{5}{4}$	6.90	$15\frac{1}{4}$	
$\frac{13}{32}$	.85	7		$1\frac{7}{8}$	7.20	$15\frac{1}{2}$	
$\frac{7}{16}$	.90	$7\frac{1}{4}$		$1\frac{3}{2}$	7.50	$15\frac{1}{2}$	
$\frac{15}{32}$	.95	$7\frac{1}{2}$		$1\frac{1}{2}$	7.80	$15\frac{3}{4}$	
$\frac{1}{2}$	1.00	$7\frac{3}{4}$		$1\frac{5}{4}$	8.10	$15\frac{3}{4}$	
$\frac{17}{32}$	1.10	8		$1\frac{3}{2}$	8.40	16	
$\frac{9}{16}$	1.20	$8\frac{1}{4}$		$1\frac{5}{4}$	8.60	16	
$\frac{19}{32}$	1.30	$8\frac{1}{2}$	No. 2, \$1.80.	$1\frac{3}{2}$	8.80	$16\frac{1}{4}$	No. 5, \$7.50.
$\frac{5}{8}$	1.40	$8\frac{3}{4}$		$1\frac{7}{8}$	9.00	$16\frac{1}{4}$	
$\frac{21}{32}$	1.50	9		$1\frac{3}{2}$	9.20	$16\frac{1}{2}$	
$\frac{11}{16}$	1.60	$9\frac{1}{4}$		$1\frac{5}{4}$	9.35	$16\frac{1}{2}$	
$\frac{23}{32}$	1.70	$9\frac{1}{2}$		$1\frac{3}{2}$	9.50	$16\frac{1}{2}$	
$\frac{3}{4}$	1.85	$9\frac{3}{4}$		$1\frac{7}{8}$	9.65	$16\frac{1}{2}$	
$\frac{25}{32}$	2.00	$9\frac{7}{8}$		$1\frac{3}{2}$	9.80	$16\frac{1}{2}$	
$\frac{27}{32}$	2.15	10		2	10.20	$16\frac{1}{2}$	
$\frac{29}{32}$	2.30	$10\frac{1}{4}$		$2\frac{1}{32}$	10.60	17	
$\frac{15}{16}$	2.45	$10\frac{1}{2}$		$2\frac{1}{16}$	11.20	17	
$1\frac{1}{16}$	2.60	$10\frac{5}{8}$		$2\frac{1}{8}$	12.00	17	
$1\frac{1}{8}$	2.75	$10\frac{3}{4}$		$2\frac{3}{16}$	12.80	$17\frac{1}{2}$	
$1\frac{1}{4}$	2.90	$10\frac{7}{8}$		$2\frac{1}{4}$	13.60	$17\frac{1}{2}$	
$1\frac{3}{8}$	3.00	11		$2\frac{5}{8}$	14.40	18	
$1\frac{1}{2}$	3.20	$11\frac{1}{8}$	No. 3, \$2.50.	$2\frac{3}{4}$	15.00	$18\frac{1}{2}$	
$1\frac{5}{8}$	3.40	$11\frac{1}{4}$		$2\frac{7}{8}$	15.60	19	
$1\frac{3}{4}$	3.60	$11\frac{1}{2}$		$2\frac{1}{2}$	16.20	$19\frac{1}{4}$	
$1\frac{7}{8}$	3.80	$11\frac{3}{4}$		$2\frac{5}{8}$	16.80	$19\frac{1}{2}$	
$1\frac{9}{8}$	4.00	$11\frac{7}{8}$		$2\frac{3}{4}$	17.60	20	
$1\frac{5}{4}$	4.20	12		$2\frac{7}{8}$	19.00	$20\frac{1}{2}$	
$1\frac{11}{8}$	4.40	$12\frac{1}{8}$		$2\frac{1}{2}$	20.00	$20\frac{1}{2}$	
$1\frac{13}{8}$	4.50	$12\frac{1}{2}$		$2\frac{5}{8}$	21.00	21	
$1\frac{3}{2}$	4.65	$14\frac{1}{8}$		$2\frac{3}{4}$	23.00	21	
$1\frac{5}{4}$	4.80	$14\frac{1}{4}$		3	25.00	22	

The above we furnish by 64ths if ordered.

Increase Twist or Constant Angle Straight Shank Drills.



Figure 289.

JOBBER'S AND MACHINISTS' SETS.				LETTER SIZES.				
Diameter.	Price per Dozen.	Price, Each.	Length.	Diameter.	Price per Dozen.	Price, Each.	Decimals of 1 Inch.	Length.
$\frac{1}{16}$	\$ 1 00	\$ 9	$2\frac{1}{2}$	A $\frac{1}{64}$ in.	\$ 2 90	\$ 26	.234	$3\frac{1}{6}$
$\frac{5}{64}$	1 10	10	$2\frac{5}{8}$	B	3 00	27	.238	"
$\frac{3}{32}$	1 20	11	$2\frac{3}{4}$	C	3 10	28	.242	"
$\frac{7}{64}$	1 30	12	$2\frac{7}{8}$	D	3 20	29	.246	"
$\frac{1}{8}$	1 45	13	3	E $\frac{1}{4}$ in.	3 30	30	.250	"
$\frac{9}{64}$	1 60	15	$3\frac{1}{8}$	F	3 40	30	.257	$4\frac{1}{4}$
$\frac{5}{32}$	1 80	16	$3\frac{1}{4}$	G	3 50	31	.261	"
$\frac{11}{64}$	2 00	18	$3\frac{3}{8}$	H $\frac{1}{16}$ in.	3 60	32	.266	"
$\frac{3}{16}$	2 20	20	$3\frac{1}{2}$	I	3 70	33	.272	"
$\frac{13}{64}$	2 40	21	$3\frac{5}{8}$	J	3 80	34	.277	"
$\frac{7}{32}$	2 65	23	$3\frac{3}{4}$	K $\frac{9}{32}$ in.	3 90	35	.281	"
$\frac{15}{64}$	2 90	26	$3\frac{7}{8}$	L	4 00	36	.290	"
$\frac{1}{4}$	3 15	28	4	M $\frac{1}{8}$ in.	4 10	36	.295	"
$\frac{17}{64}$	3 40	30	$4\frac{1}{8}$	N	4 20	37	.302	"
$\frac{9}{32}$	3 65	32	$4\frac{1}{4}$	O $\frac{5}{16}$ in.	4 30	38	.316	"
$\frac{19}{64}$	3 90	35	$4\frac{3}{8}$	P $\frac{3}{16}$ in.	4 40	39	.323	$4\frac{5}{8}$
$\frac{5}{16}$	4 20	37	$4\frac{1}{2}$	Q	4 60	40	.332	$4\frac{3}{4}$
$\frac{21}{64}$	4 50	40	$4\frac{5}{8}$	R $\frac{11}{32}$ in.	4 80	42	.339	$4\frac{7}{8}$
$\frac{11}{32}$	4 80	42	$4\frac{3}{4}$	S	5 00	44	.348	$4\frac{7}{8}$
$\frac{23}{64}$	5 10	45	$4\frac{7}{8}$	T $\frac{3}{8}$ in.	5 20	45	.358	$4\frac{7}{8}$
$\frac{3}{8}$	5 40	48	5	U	5 40	47	.368	$4\frac{7}{8}$
$\frac{25}{64}$	5 70	50	$5\frac{1}{8}$	V $\frac{7}{8}$ in.	5 60	49	.377	5
$\frac{13}{32}$	6 00	53	$5\frac{1}{4}$	W $\frac{25}{64}$ in.	5 80	51	.386	$5\frac{1}{8}$
$\frac{27}{64}$	6 40	55	$5\frac{3}{8}$	X	6 00	53	.397	$5\frac{1}{8}$
$\frac{7}{16}$	6 80	59	$5\frac{1}{2}$	Y $\frac{1}{2}$ in.	6 40	55	.404	$5\frac{1}{4}$
$\frac{29}{64}$	7 20	63	$5\frac{5}{8}$	Z	6 80	59	.413	$5\frac{3}{4}$
$\frac{15}{32}$	7 50	65	$5\frac{7}{8}$					
$\frac{31}{64}$	7 75	67	$5\frac{7}{8}$					
$\frac{1}{2}$	8 00	70	6					

For very exact work, a gauge plainly marked should accompany an order.

JOBBER'S' REAMERS.



Figure 290.

Diameter, Inches.	Price, Each.	Full Length, Inches.	Length of Flutes, Inches.	Diameter, Inches.	Price, Each.	Full Length, Inches.	Length of Flutes, Inches.
$\frac{1}{8}$	\$1 00	3	$1\frac{1}{2}$	$1\frac{11}{32}$	\$5 40	$12\frac{17}{32}$	$6\frac{17}{64}$
$\frac{5}{32}$	1 10	$3\frac{1}{4}$	$1\frac{5}{8}$	$1\frac{3}{8}$	5 60	$12\frac{5}{8}$	$6\frac{5}{16}$
$\frac{3}{16}$	1 20	$3\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{13}{32}$	5 80	$12\frac{23}{32}$	$6\frac{23}{64}$
$\frac{7}{32}$	1 30	$3\frac{3}{4}$	$1\frac{7}{8}$	$1\frac{7}{16}$	6 00	$12\frac{11}{16}$	$6\frac{11}{32}$
$\frac{1}{4}$	1 40	4	2	$1\frac{15}{32}$	6 20	$12\frac{3}{4}$	$6\frac{3}{16}$
$\frac{9}{32}$	1 45	$4\frac{1}{4}$	$2\frac{1}{8}$	$1\frac{1}{2}$	6 40	13	$6\frac{1}{2}$
$\frac{5}{16}$	1 50	$4\frac{1}{2}$	$2\frac{1}{4}$	$1\frac{7}{32}$	6 60	13	$6\frac{1}{4}$
$\frac{11}{32}$	1 55	$4\frac{3}{4}$	$2\frac{3}{8}$	$1\frac{9}{16}$	6 80	13	$6\frac{1}{2}$
$\frac{3}{8}$	1 60	5	$2\frac{1}{2}$	$1\frac{5}{8}$	7 00	13	$6\frac{1}{2}$
$\frac{13}{32}$	1 70	$5\frac{1}{4}$	$2\frac{5}{8}$	$1\frac{3}{2}$	7 20	13	$6\frac{1}{2}$
$\frac{7}{16}$	1 75	$5\frac{1}{2}$	$2\frac{3}{4}$	$1\frac{13}{32}$	7 40	$13\frac{1}{4}$	$6\frac{3}{4}$
$\frac{15}{32}$	1 85	$5\frac{3}{4}$	$2\frac{7}{8}$	$1\frac{15}{16}$	7 60	$13\frac{1}{2}$	$6\frac{3}{4}$
$\frac{1}{2}$	1 90	6	3	$1\frac{3}{2}$	7 80	13	$6\frac{3}{4}$
$\frac{17}{32}$	1 95	$6\frac{1}{4}$	$3\frac{1}{8}$	$1\frac{3}{4}$	8 00	$13\frac{1}{2}$	$6\frac{3}{4}$
$\frac{9}{16}$	2 00	$6\frac{1}{2}$	$3\frac{1}{4}$	$1\frac{5}{2}$	8 20	$13\frac{1}{2}$	$6\frac{3}{4}$
$\frac{19}{32}$	2 10	$6\frac{3}{4}$	$3\frac{3}{8}$	$1\frac{11}{16}$	8 40	$13\frac{1}{2}$	$6\frac{3}{4}$
$\frac{5}{8}$	2 20	7	$3\frac{1}{2}$	$1\frac{3}{2}$	8 60	$13\frac{1}{2}$	$6\frac{3}{4}$
$\frac{21}{32}$	2 30	$7\frac{11}{32}$	$3\frac{3}{4}$	$1\frac{7}{8}$	8 80	14	7
$\frac{11}{16}$	2 40	$7\frac{11}{16}$	$3\frac{7}{8}$	$1\frac{9}{8}$	9 00	14	7
$\frac{23}{32}$	2 50	$8\frac{1}{8}$	$4\frac{1}{16}$	$1\frac{5}{4}$	9 20	14	7
$\frac{3}{4}$	2 60	$8\frac{3}{8}$	$4\frac{3}{16}$	$1\frac{3}{2}$	9 40	14	7
$\frac{25}{32}$	2 70	$8\frac{23}{32}$	$4\frac{23}{64}$	2	9 60	14	7
$\frac{13}{16}$	2 80	$9\frac{1}{16}$	$4\frac{17}{32}$	$2\frac{1}{16}$	10 00	$14\frac{1}{2}$	$7\frac{1}{4}$
$\frac{27}{32}$	2 95	$9\frac{3}{8}$	$4\frac{11}{16}$	$2\frac{1}{8}$	10 40	$14\frac{1}{2}$	$7\frac{1}{4}$
$\frac{7}{8}$	3 10	$9\frac{11}{16}$	$4\frac{27}{32}$	$2\frac{3}{16}$	10 80	15	$7\frac{1}{2}$
$\frac{29}{32}$	3 25	$10\frac{3}{32}$	$5\frac{3}{64}$	$2\frac{1}{4}$	11 30	15	$7\frac{1}{2}$
$\frac{15}{16}$	3 40	$10\frac{1}{4}$	$5\frac{1}{8}$	$2\frac{5}{16}$	11 80	15	$7\frac{1}{2}$
$\frac{31}{32}$	3 55	$10\frac{11}{16}$	$5\frac{11}{32}$	$2\frac{3}{8}$	12 30	15	$7\frac{1}{2}$
1	3 70	$10\frac{7}{8}$	$5\frac{7}{16}$	$2\frac{7}{16}$	12 80	$15\frac{1}{2}$	$7\frac{3}{4}$
$1\frac{1}{32}$	3 85	$11\frac{1}{16}$	$5\frac{37}{32}$	$2\frac{1}{2}$	13 40	$15\frac{1}{2}$	$7\frac{3}{4}$
$1\frac{1}{16}$	4 00	$11\frac{1}{4}$	$5\frac{5}{8}$	$2\frac{9}{16}$	14 00	$15\frac{1}{2}$	$7\frac{3}{4}$
$1\frac{3}{32}$	4 15	$11\frac{7}{16}$	$5\frac{23}{32}$	$2\frac{5}{8}$	14 60	16	8
$1\frac{1}{8}$	4 30	$11\frac{5}{8}$	$5\frac{13}{16}$	$2\frac{11}{16}$	15 40	16	8
$1\frac{5}{32}$	4 45	$11\frac{13}{16}$	$5\frac{29}{32}$	$2\frac{3}{4}$	16 20	16	8
$1\frac{3}{16}$	4 60	12	6	$2\frac{7}{8}$	17 00	$16\frac{1}{2}$	$8\frac{1}{4}$
$1\frac{7}{32}$	4 75	$12\frac{1}{8}$	$6\frac{1}{16}$	$2\frac{15}{16}$	17 80	$16\frac{1}{2}$	$8\frac{1}{4}$
$1\frac{1}{4}$	4 90	$12\frac{1}{4}$	$6\frac{1}{8}$	3	18 60	$16\frac{1}{2}$	$8\frac{1}{4}$
$1\frac{9}{32}$	5 05	$12\frac{11}{32}$	$6\frac{11}{64}$		19 40	$16\frac{1}{2}$	$8\frac{1}{4}$
$1\frac{5}{16}$	5 20	$12\frac{7}{16}$	$6\frac{7}{32}$				

Reamers of any style, size, or length, made to order; also furnished by 64ths. Flutes straight or spiral, as desired.

These Reamers furnished with Taper Shank if desired. (Price quoted on application.)

SHELL REAMERS.



Figure 291.
Shell Reamer.

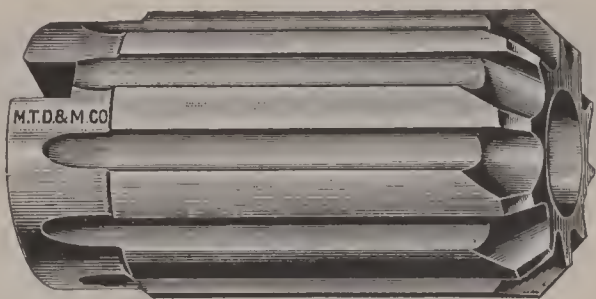


Figure 292.
Rose shell Reamer.

Diameter, Inches.	Price, Each.	Length, Inches.	Size Hole, Inches.	Diameter, Inches.	Price, Each.	Length, Inches.	Size Hole, Inches.
$\frac{1}{4}$	\$1.10	1 $\frac{1}{2}$	$\frac{1}{8}$	2 $\frac{1}{16}$	\$7.60	4	1 $\frac{1}{2}$
$\frac{5}{16}$	1.10	1 $\frac{1}{2}$	$\frac{1}{8}$	2 $\frac{3}{4}$	8.00	4	1 $\frac{1}{2}$
$\frac{3}{8}$	1.20	1 $\frac{3}{4}$	$\frac{3}{16}$	2 $\frac{1}{16}$	8.40	4	1 $\frac{1}{2}$
$\frac{7}{16}$	1.30	1 $\frac{3}{4}$	$\frac{3}{16}$	2 $\frac{7}{8}$	8.80	4	1 $\frac{1}{2}$
$\frac{1}{2}$	1.40	2	$\frac{1}{4}$	2 $\frac{1}{16}$	9.20	4	1 $\frac{1}{2}$
$\frac{9}{16}$	1.50	2	$\frac{1}{4}$	3	9.60	4	1 $\frac{1}{2}$
$\frac{5}{8}$	1.60	2 $\frac{1}{4}$	$\frac{3}{8}$	3 $\frac{1}{16}$	9.90	4 $\frac{1}{2}$	1 $\frac{3}{4}$
1 $\frac{1}{16}$	1.60	2 $\frac{1}{4}$	$\frac{3}{8}$	3 $\frac{1}{8}$	10.20	4 $\frac{1}{2}$	1 $\frac{3}{4}$
$\frac{3}{4}$	1.60	2 $\frac{1}{2}$	$\frac{1}{2}$	3 $\frac{3}{16}$	10.60	4 $\frac{1}{2}$	1 $\frac{3}{4}$
1 $\frac{3}{16}$	1.60	2 $\frac{1}{2}$	$\frac{1}{2}$	3 $\frac{1}{4}$	11.00	4 $\frac{1}{2}$	1 $\frac{3}{4}$
$\frac{7}{8}$	1.70	2 $\frac{1}{2}$	$\frac{1}{2}$	3 $\frac{5}{16}$	11.50	4 $\frac{1}{2}$	1 $\frac{3}{4}$
1 $\frac{5}{16}$	1.70	2 $\frac{1}{2}$	$\frac{1}{2}$	3 $\frac{3}{8}$	12.00	4 $\frac{1}{2}$	1 $\frac{3}{4}$
1	1.80	2 $\frac{3}{4}$	$\frac{5}{8}$	3 $\frac{7}{16}$	12.50	4 $\frac{1}{2}$	1 $\frac{3}{4}$
1 $\frac{1}{16}$	1.80	2 $\frac{3}{4}$	$\frac{5}{8}$	3 $\frac{1}{2}$	13.00	4 $\frac{1}{2}$	1 $\frac{3}{4}$
1 $\frac{1}{8}$	1.90	2 $\frac{3}{4}$	$\frac{5}{8}$	3 $\frac{9}{16}$	13.50	5	2
1 $\frac{3}{16}$	2.00	2 $\frac{3}{4}$	$\frac{5}{8}$	3 $\frac{5}{8}$	14.00	5	2
1 $\frac{1}{4}$	2.20	2 $\frac{3}{4}$	$\frac{5}{8}$	3 $\frac{1}{16}$	14.50	5	2
1 $\frac{5}{16}$	2.40	3	$\frac{3}{4}$	3 $\frac{3}{4}$	15.00	5	2
1 $\frac{3}{8}$	2.60	3	$\frac{3}{4}$	3 $\frac{1}{16}$	15.50	5	2
1 $\frac{7}{16}$	2.80	3	$\frac{3}{4}$	3 $\frac{7}{8}$	16.00	5	2
1 $\frac{1}{2}$	3.00	3	$\frac{3}{4}$	3 $\frac{5}{16}$	17.00	5	2
1 $\frac{9}{16}$	3.20	3	$\frac{3}{4}$	4	18.00	5	2
1 $\frac{5}{8}$	3.50	3	$\frac{3}{4}$	4 $\frac{1}{16}$	18.30	5 $\frac{1}{2}$	2 $\frac{1}{4}$
1 $\frac{11}{16}$	3.80	3 $\frac{1}{2}$	1	4 $\frac{1}{8}$	18.60	5 $\frac{1}{2}$	2 $\frac{1}{4}$
1 $\frac{3}{4}$	4.10	3 $\frac{1}{2}$	1	4 $\frac{3}{16}$	19.00	5 $\frac{1}{2}$	2 $\frac{1}{4}$
1 $\frac{13}{16}$	4.40	3 $\frac{1}{2}$	1	4 $\frac{1}{4}$	19.40	5 $\frac{1}{2}$	2 $\frac{1}{4}$
1 $\frac{7}{8}$	4.70	3 $\frac{1}{2}$	1	4 $\frac{5}{16}$	19.80	5 $\frac{1}{2}$	2 $\frac{1}{4}$
1 $\frac{15}{16}$	5.00	3 $\frac{1}{2}$	1	4 $\frac{3}{8}$	20.20	5 $\frac{1}{2}$	2 $\frac{1}{4}$
2	5.20	3 $\frac{1}{2}$	1	4 $\frac{7}{16}$	20.60	5 $\frac{1}{2}$	2 $\frac{1}{4}$
2 $\frac{1}{16}$	5.40	3 $\frac{3}{4}$	1 $\frac{1}{4}$	4 $\frac{1}{2}$	21.00	5 $\frac{1}{2}$	2 $\frac{1}{4}$
2 $\frac{1}{8}$	5.60	3 $\frac{3}{4}$	1 $\frac{1}{4}$	4 $\frac{9}{16}$	21.60	6	2 $\frac{1}{2}$
2 $\frac{3}{16}$	5.80	3 $\frac{3}{4}$	1 $\frac{1}{4}$	4 $\frac{5}{8}$	22.20	6	2 $\frac{1}{2}$
2 $\frac{1}{4}$	6.00	3 $\frac{3}{4}$	1 $\frac{1}{4}$	4 $\frac{11}{16}$	22.80	6	2 $\frac{1}{2}$
2 $\frac{5}{16}$	6.20	3 $\frac{3}{4}$	1 $\frac{1}{4}$	4 $\frac{3}{4}$	23.40	6	2 $\frac{1}{2}$
2 $\frac{3}{8}$	6.40	3 $\frac{3}{4}$	1 $\frac{1}{4}$	4 $\frac{1}{16}$	24.00	6	2 $\frac{1}{2}$
2 $\frac{7}{16}$	6.60	3 $\frac{3}{4}$	1 $\frac{1}{4}$	4 $\frac{7}{8}$	24.60	6	2 $\frac{1}{2}$
2 $\frac{1}{2}$	6.80	3 $\frac{3}{4}$	1 $\frac{1}{4}$	4 $\frac{1}{16}$	25.20	6	2 $\frac{1}{2}$
2 $\frac{9}{16}$	7.00	4	1 $\frac{1}{2}$	5	26.00	6	2 $\frac{1}{2}$
2 $\frac{5}{8}$	7.30	4	1 $\frac{1}{2}$				

SETS OF MACHINISTS' HAND TAPS.

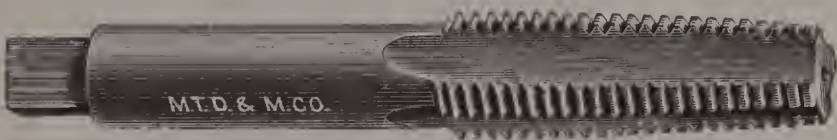


Figure 293.
TAPER TAP.



Figure 294.
PLUG TAP.

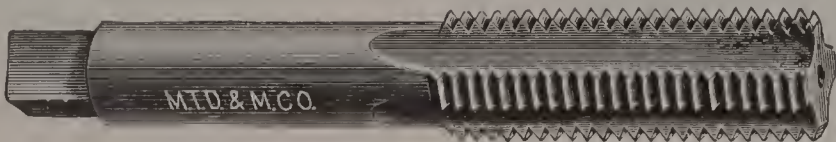


Figure 295.

BOTTOMING TAP.
V, U. S. OR WHITWORTH SHAPE OF THREAD.

Size, Inches.	Whole Length, Inches.	Length of Thread, Inches.	Number V Threads to Inch.	Price, Each.	Price Per Set of 3 Taps.
$\frac{1}{4}$	$2\frac{3}{4}$	$1\frac{1}{4}$	16, 18, 20, 22, 24, 26, 28, 32	\$ 45	\$ 1 35
$\frac{5}{16}$	3	$1\frac{1}{4}$	16, 18, 20, 22, 24, 26, 28	50	1 50
$\frac{3}{8}$	$3\frac{1}{4}$	$1\frac{3}{8}$	14, 16, 18, 20, 22, 24, 26, 28	55	1 65
$\frac{7}{16}$	$3\frac{1}{2}$	$1\frac{1}{2}$	12, 14, 16, 18, 20, 22, 24, 26	60	1 80
$\frac{1}{2}$	$3\frac{3}{4}$	$1\frac{5}{8}$	12, 13, 14, 16, 18, 20, 22, 24, 26	70	2 10
$\frac{9}{16}$	4	$1\frac{11}{16}$	12, 14, 20, 22, 24, 26	80	2 40
$\frac{5}{8}$	$4\frac{1}{4}$	$1\frac{13}{16}$	10, 11, 12, 20, 22, 24, 26	90	2 70
$\frac{11}{16}$	$4\frac{1}{2}$	$1\frac{15}{16}$	10, 11, 12, 20, 22, 24, 26	1 05	3 15
$\frac{3}{4}$	$4\frac{3}{4}$	2	10, 11, 12, 20, 22, 24, 26	1 20	3 60
$\frac{13}{16}$	$4\frac{7}{8}$	$2\frac{1}{8}$	10, 12	1 40	4 20
$\frac{7}{8}$	$5\frac{1}{8}$	$2\frac{3}{16}$	9, 10, 12, 20, 22, 24, 26	1 60	4 80
$\frac{15}{16}$	$5\frac{1}{4}$	$2\frac{5}{16}$	9	1 80	5 40
1	$5\frac{1}{2}$	$2\frac{3}{8}$	8, 12, 20, 22, 24, 26,	2 00	6 00
$1\frac{1}{8}$	$5\frac{7}{8}$	$2\frac{9}{16}$	7, 8	2 25	6 75
$1\frac{1}{4}$	$6\frac{1}{4}$	$2\frac{1}{4}$	7	2 60	7 80
$1\frac{3}{8}$	$6\frac{3}{8}$	$2\frac{1}{8}$	6	3 00	9 00
$1\frac{1}{2}$	7	3	6	3 50	10 50
$1\frac{5}{8}$	$7\frac{1}{4}$	$3\frac{3}{16}$	5, $5\frac{1}{2}$	4 20	12 60
$1\frac{3}{4}$	$7\frac{3}{8}$	$3\frac{5}{16}$	5	5 00	15 00
$1\frac{7}{8}$	$7\frac{7}{8}$	$3\frac{7}{16}$	$4\frac{1}{2}$, 5	5 80	17 40
2	$8\frac{1}{4}$	$3\frac{1}{2}$	$4\frac{1}{2}$	6 70	20 10
$2\frac{1}{8}$	$8\frac{1}{2}$	$3\frac{3}{4}$	$4\frac{1}{2}$	7 80	23 40
$2\frac{1}{4}$	$8\frac{3}{4}$	$3\frac{1}{2}$	$4\frac{1}{2}$	9 00	27 00
$2\frac{3}{8}$	9	4	$4\frac{1}{2}$	10 25	30 75
$2\frac{1}{2}$	$9\frac{1}{4}$	$4\frac{1}{8}$	4	11 50	34 50
$2\frac{5}{8}$	$9\frac{1}{2}$	$4\frac{1}{4}$	4	12 75	38 25
$2\frac{3}{4}$	$9\frac{3}{4}$	$4\frac{5}{16}$	4	14 00	42 00
$2\frac{7}{8}$	10	$4\frac{7}{16}$	4	15 50	46 50
3	$10\frac{1}{8}$	$4\frac{9}{16}$	$3\frac{1}{2}$	17 00	51 00
$3\frac{1}{8}$	$10\frac{3}{8}$	$4\frac{3}{8}$	$3\frac{1}{2}$	18 50	55 50
$3\frac{1}{4}$	$10\frac{1}{2}$	$4\frac{1}{4}$	$3\frac{1}{2}$	20 00	60 00
$3\frac{3}{8}$	$10\frac{3}{4}$	$4\frac{1}{2}$	$3\frac{1}{2}$, $3\frac{1}{4}$	22 00	66 00
$3\frac{1}{2}$	$10\frac{7}{8}$	$4\frac{5}{16}$	$3\frac{1}{4}$	24 00	72 00
$3\frac{5}{8}$	11	5	$3\frac{1}{4}$	26 00	78 00
$3\frac{3}{4}$	$11\frac{1}{8}$	$5\frac{1}{16}$	3	28 00	84 00
$3\frac{7}{8}$	$11\frac{1}{4}$	$5\frac{1}{8}$	3	30 50	91 50
4	$11\frac{1}{2}$	$5\frac{1}{4}$	3	33 00	99 00

Left-hand Taps, regular sizes as above, same list prices as right-hand.

STEEL SOCKETS AND SLEEVES.

MORSE TAPER SOCKETS.

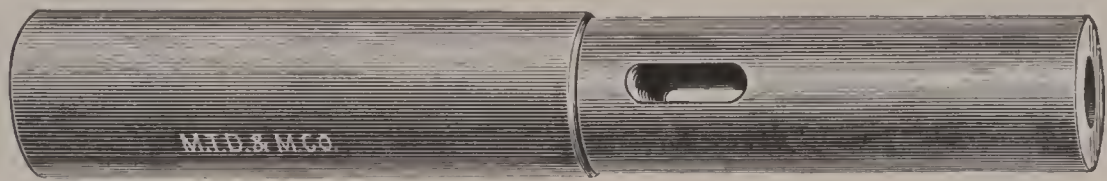


Figure 296.

STEEL SOCKETS FOR TAPER SHANK DRILLS.

No. 1.	Holds $\frac{1}{4}$ to $\frac{19}{32}$ inches, inclusive	\$ 1 20
	Entire length, 7 inches; diameter of blank end, $1\frac{1}{8}$ inches.	
No. 2.	Holds $\frac{5}{8}$ to $\frac{29}{32}$ inches, inclusive	1 80
	Entire length, 8 inches; diameter of blank end, $1\frac{1}{4}$ inches.	
No. 3.	Holds $\frac{15}{16}$ to $1\frac{1}{4}$ inches, inclusive	2 50
	Entire length, 10 inches; diameter of blank end, $1\frac{1}{2}$ inches.	
No. 4.	Holds $1\frac{9}{16}$ to 2 inches, inclusive	4 00
	Entire length, 13 inches; diameter of blank end, 2 inches.	
No. 5.	Holds $2\frac{1}{8}$ to 3 inches, inclusive	7 50
	Entire length, 15 inches; diameter of blank end, $2\frac{1}{2}$ inches.	
No. 6.	Holds $3\frac{1}{8}$ to 4 inches, inclusive	14 00
	Entire length, 18 inches; diameter of blank end, 3 inches.	

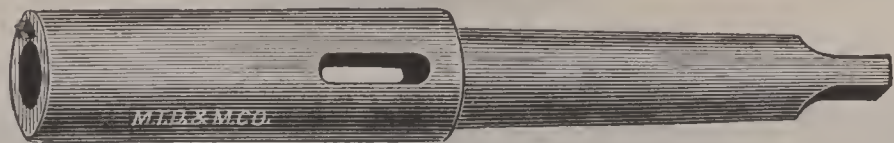


Figure 297.

STEEL SOCKETS FOR MORSE TAPER SHANK DRILLS.

No. 1.	With Shank fitted to No. 2 or 3 Socket	\$ 2 00
No. 2.	With Shank fitted to No. 3 Socket	2 50
No. 2.	With Shank fitted to No. 4 Socket	3 20
No. 3.	With Shank fitted to No. 4 Socket	3 20
No. 4.	With Shank fitted to No. 5 Socket	4 80
No. 5.	With Shank fitted to No. 6 Socket	12 00

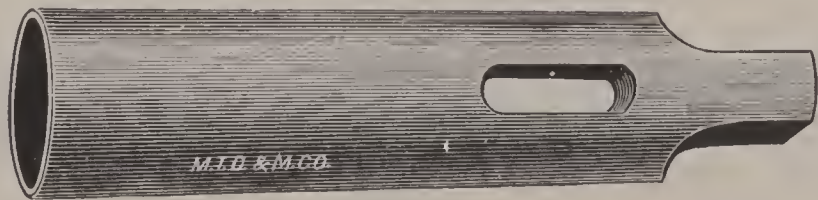


Figure 298.

STEEL SLEEVES FOR MORSE TAPER SHANK DRILLS.

No. 1.	Fitted to No. 2 or 3 Socket	\$ 1 80
No. 1.	Fitted to No. 4 Socket	3 00
No. 2.	Fitted to No. 3 Socket	2 40
No. 2.	Fitted to No. 4 Socket	3 00
No. 3.	Fitted to No. 4 Socket	3 00
No. 4.	Fitted to No. 5 Socket	4 40

TAPER SOCKET RATCHET DRILLS, PACKER.
WITH TAPER HOLE IN SOCKET.

These Ratchets will take Morse Taper Shank Drills or Morse Taper Sockets. Made in three sizes, numbers same as the regular Packer Ratchet and finished in the same thorough manner. All working parts are hardened.

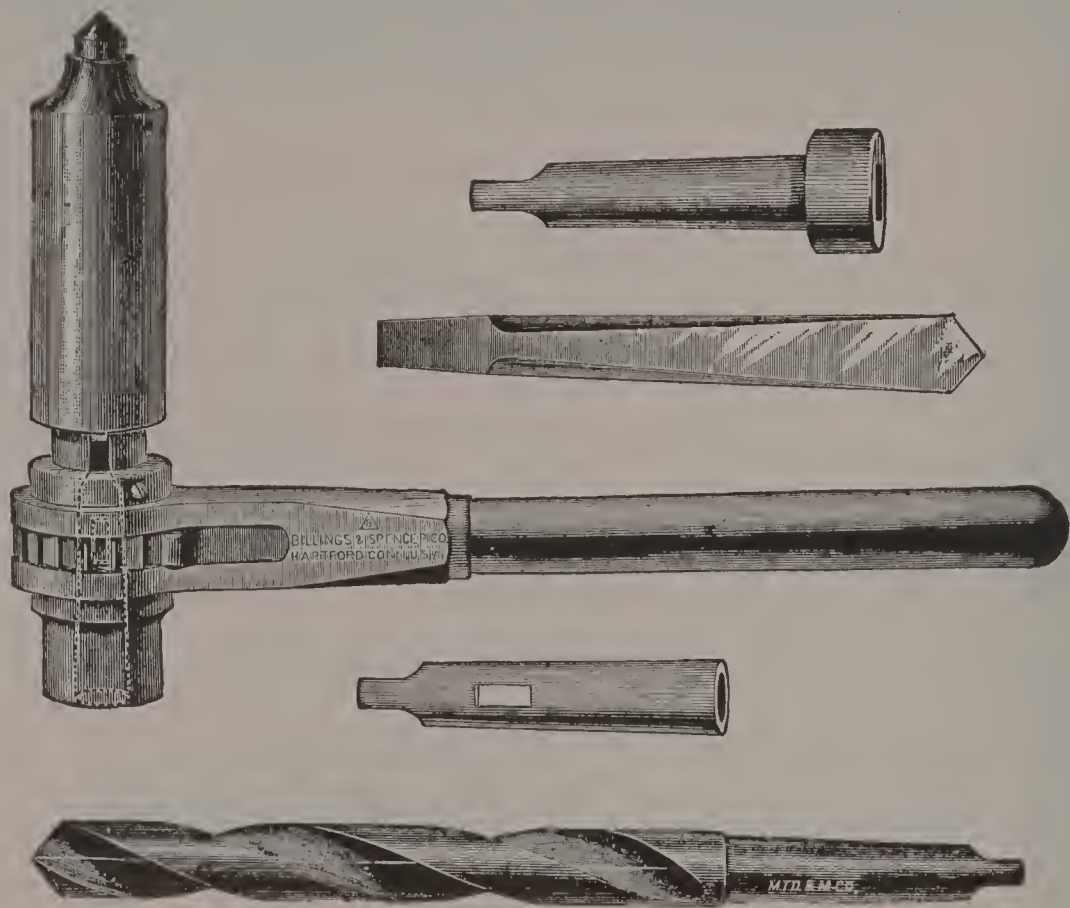


Figure 299.

No. 2.	12-inch handle, taking No. 1 Morse Taper Socket or Morse Taper Shank Drills from $\frac{5}{8}$ to $\frac{29}{32}$ inclusive	\$16 00
No. 3.	15-inch handle, taking No. 2 Morse Taper Socket, or Morse Taper Shank Drills from $\frac{15}{16}$ to $1\frac{1}{4}$ inclusive	20 00
No. 4.	17-inch handle, taking No. 3 Morse Taper Socket, or Morse Taper Shank Drills, from $1\frac{9}{16}$ to 2 inches, inclusive	25 00
Socket No. 1,	for Taper Shank Drills from $\frac{1}{4}$ to $\frac{19}{32}$, inclusive	1 50
Socket No. 2,	for Taper Shank Drills from $\frac{5}{8}$ to $\frac{29}{32}$, inclusive	2 00
Socket No. 3,	for Taper Shank Drills from $\frac{15}{16}$ to $1\frac{1}{4}$ inclusive	2 50
No. 3.	Flat Drill Socket for No. 2 Packer Ratchet and fitting No. 2 Taper Socket	1 75
No. 4.	Flat Drill Socket for No. 3 Packer Ratchet and fitting No. 3 Taper Socket	1 75
No. 5.	Flat Drill Socket for No. 4 Ratchet	2 00
No. 2, Packer Ratchet, with No. 1 Taper Socket, will take Taper Shank Drills from $\frac{1}{4}$ to $\frac{29}{32}$, inclusive.		
No. 3, Packer Ratchet, with No. 1 and 2 Taper Sockets, will take Taper Shank Drills from $\frac{1}{4}$ to $1\frac{1}{4}$, inclusive.		
No. 4, Packer Ratchet, with Nos. 1, 2 and 3 Taper Sockets, will take Taper Shank Drills from $\frac{1}{4}$ to 2 inches, inclusive.		



GENUINE PACKER
RATCHET DRILLS.

For Flat or Taper Square Shank Twist Drills, drop forged from the best Bar Steel for the purpose. They have been before the public many years and have given entire satisfaction.

Figure 300.

Packer Ratchets.

No. 1.	10-inch Handles . .	\$10 50	No. 4.	17-inch Handles . .	\$19 00
No. 2.	12-inch Handles . .	13 50	No. 5.	20-inch Handles . .	23 00
No. 3.	15-inch Handles . .	16 00			

Boiler Ratchets.

No. 1.	10-inch Handles . .	\$ 9 00	No. 2.	12-inch Handles . .	\$10 50
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Auger Ratchets.

No. 1		\$7 00	Sockets	\$3 00
No. 2		8 00	Screw	3 00

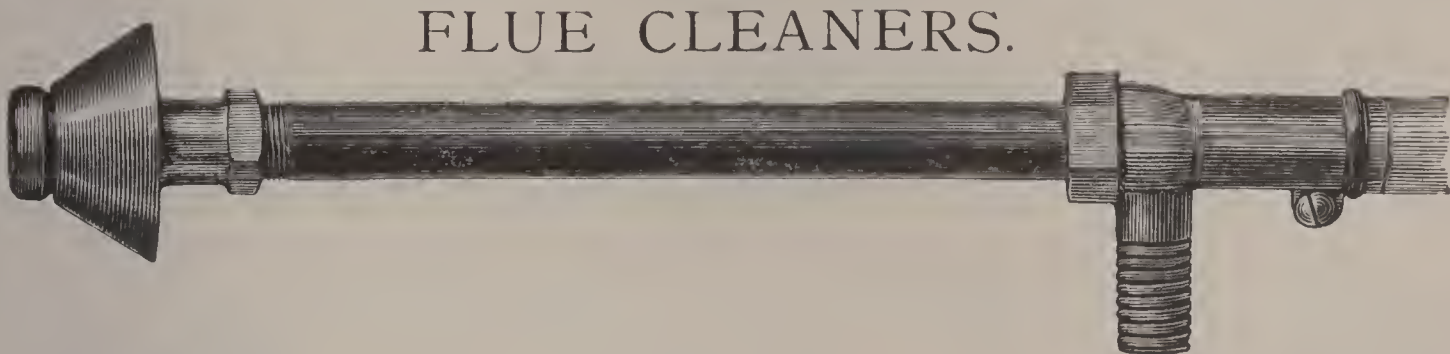


Figure 301.

Robinson's Steam Tube Cleaners.—Fig. 301

No.	1	2
For tubes	1½ to 2½	2 to 4
Each	8.50	10.00

Above for Cleaners only. Valves and Hose extra.

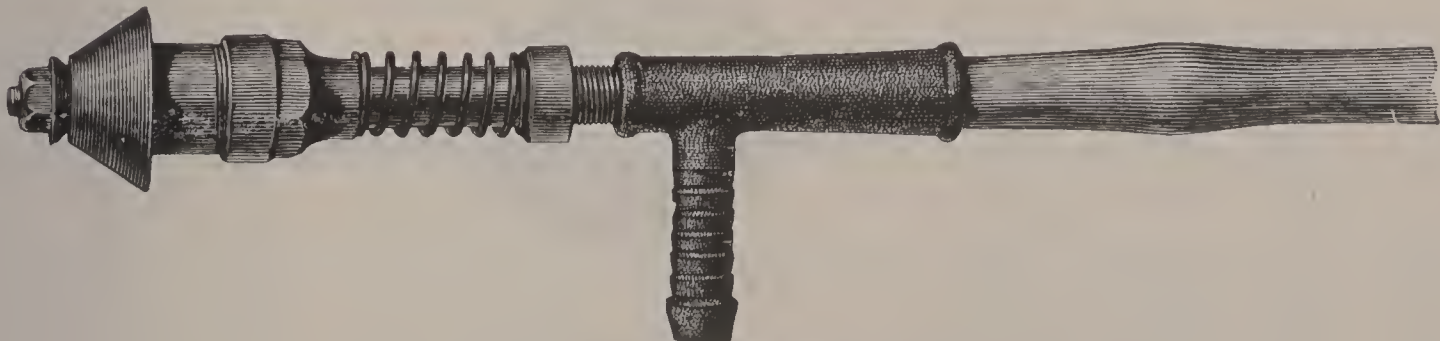


Figure 302.

McLaughlin's Steam Tube Cleaners.—Fig. 302

No.	0	1	2	3	4
For tubes	1 to 1¾	1½ to 2¼	2 to 3	2½ to 5	4 to 6
Each	7.00	8.00	9.00	10.00	12.00

We furnish these cleaners with steam hose attached in any required length. An extra charge is made for the hose and connections.

FLUE CLEANERS (Continued).



Figure 303.

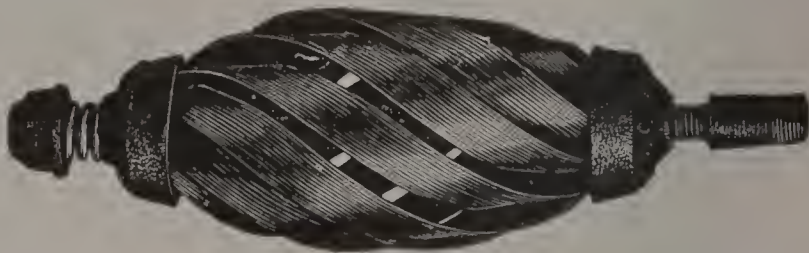


Figure 304.

Elastic Tube Cleaners.—Fig. 303

Size	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Each	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00

Christoffel Elliptical Tube Cleaners.—Fig. 304

Size	1¼	1½	2	2¼	2½	2¾	3	3¼	3½	3¾	4	4½	5	6
Each	2.00	2.00	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	5.65	6.25	7.50



Figure 305.

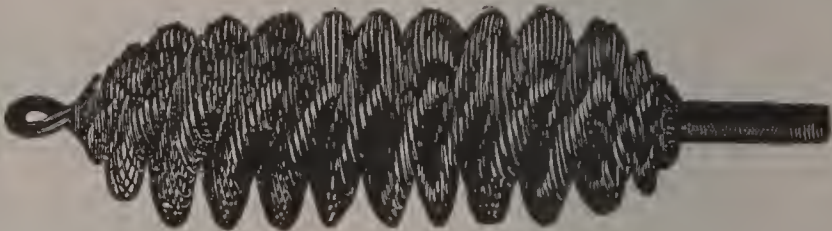


Figure 306.

Ingalls' Tube Cleaners.—Fig. 305

Size	2	2¼	2½	2¾	3	3¼	3½	4	4½	5	6
Each	2.00	2.25	2.50	2.75	3.00	3.25	3.50	4.00	4.50	5.00	6.00

Christoffel Coil Tube Cleaners.—Fig. 306

Size	1¼	1½	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Each	1.00	1.00	1.10	1.20	1.30	1.40	1.50	1.65	1.75	1.90	2.00

TUBE EXPANDERS.

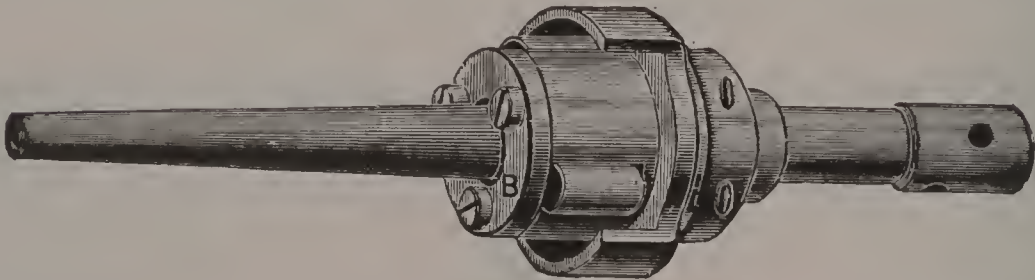


Figure 307.

Tube Expander.—Fig. 307.

1¾-inch	\$25 00	2½-inch	\$42 00
1⅞-inch	25 00	2¾-inch	48 00
2 -inch	30 00	3 -inch	55 00
2¼-inch	35 00		

PIPE CUTTING AND THREADING MACHINES.

THE FORBES PATENT

DIE STOCKS.

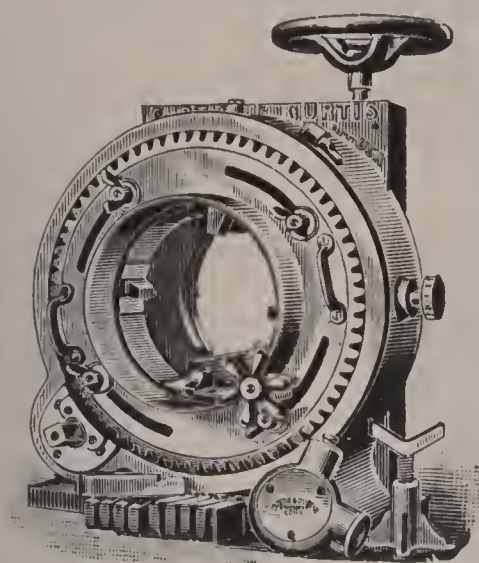


Figure 308.

No. 56 Hand Machine.

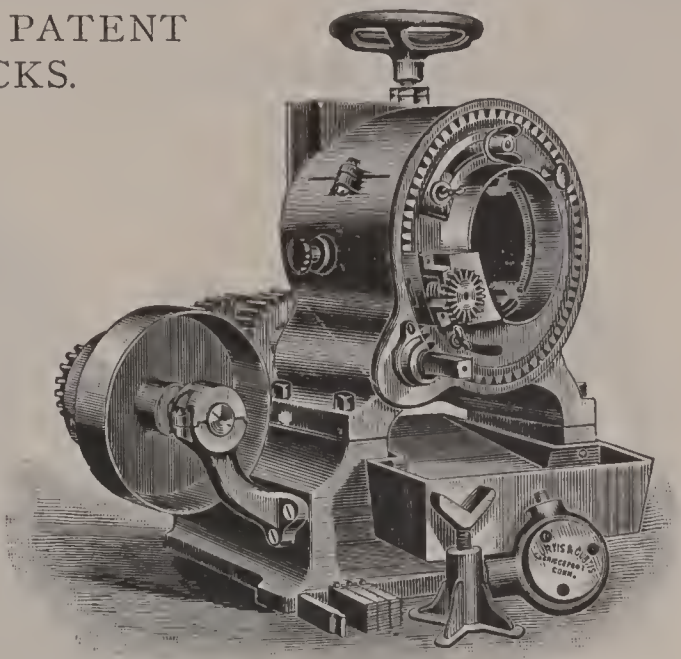


Figure 309.

No. 76 Hand and Power Machine.

In presenting these machines we would ask your attention to the following points:

The Forbes Patent Die Stocks is a machine with which one man can cut off and thread large pipe up to 10 inches diameter without assistance, while with the smaller size of machines a boy will thread 2 and 3-inch pipe with only one hand on the crank.

This die stock is a complete tool, being all that is required to thread or cut off pipe.

It is much lighter than the old style of stock and the vise which must accompany it, and is less expensive than the above combination.

It can be used in confined places, and it is especially adapted to trench work.

Its dies can be sharpened by grinding without drawing temper, and when one of a set is lost or broken, a new one can be supplied without replacing the set. They draw back out of the way when the thread is cut, yet always cut standard sizes, and are adjustable to any variation of the fittings.

The shells are adjustable for wear, which greatly prolongs the life of the machine.

Its parts can be duplicated, when worn out, at a small cost.

Number. Hand Mach.	Number. Hand and Power.	Range.	Weight. Net. Hand.	Weight. Net. Hand and Power.	Price. Hand.	Price. Hand and Power.
* 30	* 70	¼ to 2 inch, both Right and Left.	138 lbs.	320 lbs.	\$50.00	\$100.00
* 32	* 72	¼ to 2 inch, for Solid Dies, (without dies)	130 lbs.	315 lbs.	45.00	95.00
* 34	* 74	1 to 3 inch R. H., 1 to 2 inch L. H.	155 lbs.	340 lbs.	75.00	125.00
* 36	* 76	¾ to 3 inch R. H., ¾ to 2 inch L. H.	160 lbs.	343 lbs.	85.00	135.00
* 37	* 77	¼ to 3 inches, R. and L.	160 lbs.	348 lbs.	105.00	155.00
† 46	† 78	2½ to 4 inches, R. H.	220 lbs.	515 lbs.	85.00	140.00
* 38	* 80	1½ to 4 inches, R. H.	222 lbs.	516 lbs.	100.00	150.00
* 40	* 82	1½ to 4 inches, R. and L.	225 lbs.	517 lbs.	115.00	165.00
* 42	* 84	1 to 4 inches, R. H.	223 lbs.	516 lbs.	110.00	160.00
* 44	* 86	1 to 4 inches, R. and L.	235 lbs.	527 lbs.	130.00	180.00
† 50	† 88	4 to 6 inches, R. H.	298 lbs.	635 lbs.	115.00	170.00
† 52	† 90	3½ to 6 inches, R. H.	298 lbs.	640 lbs.	130.00	180.00
† 54	† 92	2½ to 5 inches, R. H.	300 lbs.	640 lbs.	150.00	200.00
† 56		2½ to 6 inches, R. H.	303 lbs.		175.00	
† 62	† 94	2½ to 6 inches, R. H. (extra heavy.)	750 lbs.	645 lbs.	300.00	225.00
* 58	* 96	1 to 6 inches, R. H.	330 lbs.	665 lbs.	190.00	250.00
* 60	* 98	1 to 6 inches, R. and L.	348 lbs.	675 lbs.	235.00	285.00
* 63	* 99	2½ to 8 inches, R. and L.	625 lbs.	1130 lbs.	360.00	535.00
† 64	† 100	2½ to 8 inches, R. H.	600 lbs.	1108 lbs.	325.00	500.00
† 66	† 102	2½ to 10 inches, R. H.	750 lbs.	1510 lbs.	500.00	700.00
* 67	* 104	2½ to 10 inches, R. H.	760 lbs.	1520 lbs.	500.00	700.00
* 68	* 106	2½ to 10 inches, R. and L.	800 lbs.	1560 lbs.	550.00	750.00

*Pressure Feed Machines. †Lead Screw Machine. Price of Power Machines includes Countershafts.

Machines Nos. 30 to 37 and from 70 to 77 have no cut-off as on small sizes of pipe a roller cutter is generally preferred.

New Improved Pipe Cutting and Threading Machine.

FOR HAND POWER.

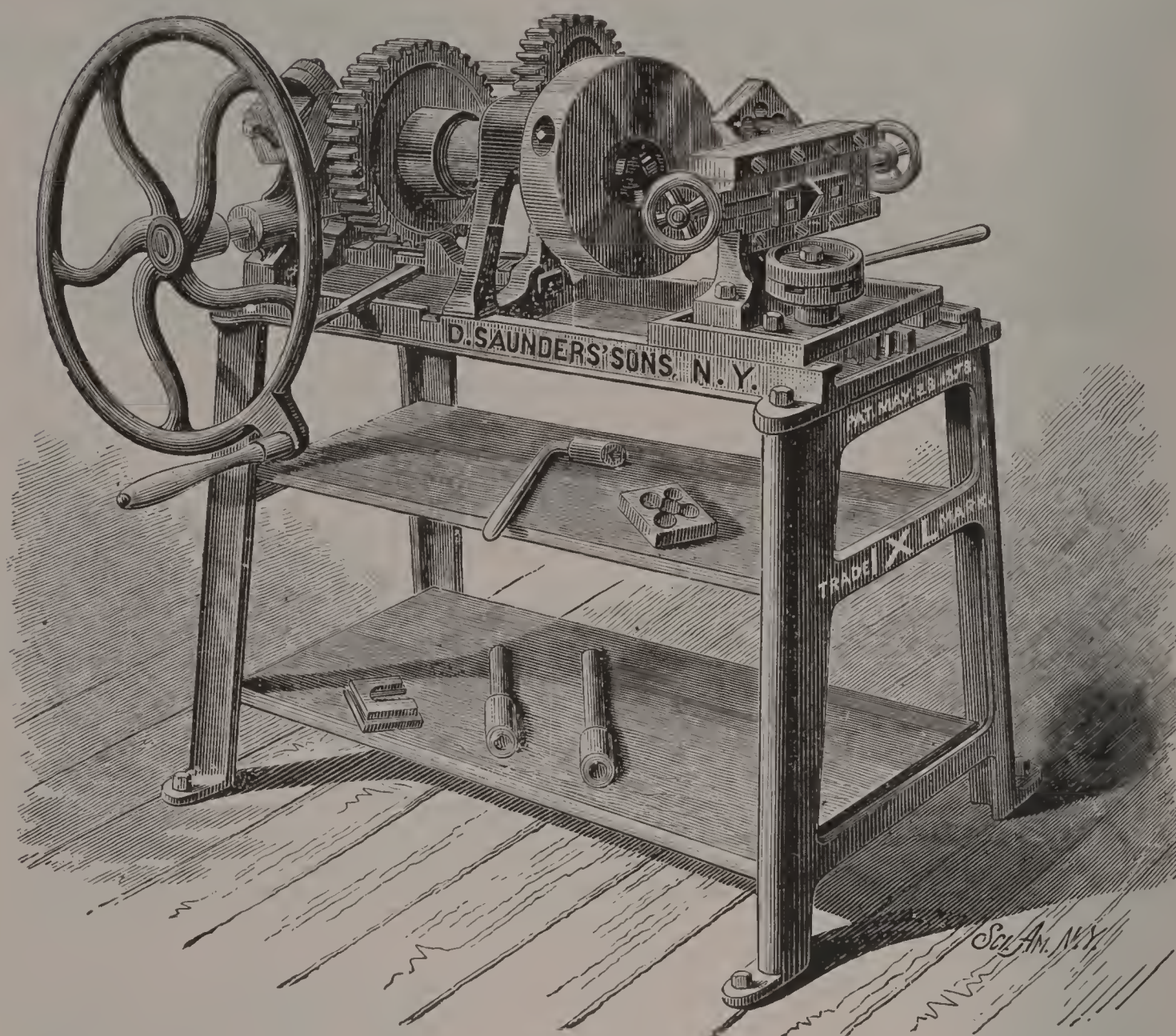


Figure 310.

HAND MACHINE.

With set of right-hand solid dies $\frac{1}{4}$ to 2 inches inclusive, fly wheel, and set of sockets for making nipples $\frac{1}{4}$ to 2 inches, complete. Price on application.

POWER AND HAND MACHINE.

With set of right-hand solid dies, $\frac{1}{4}$ to 2 inches inclusive, fly wheel, pulleys, countershaft and set of sockets for making nipples, $\frac{1}{4}$ to 2 inches, complete. Price on application.

Speed of countershaft, 150 revolutions per minute. Pulleys, 11 inches in diameter—two loose, each 7 inches face, one fast, $3\frac{1}{2}$ inches face. Weight, hand machine, 475 pounds, power and hand machine, 675 pounds.

Attachments fitted to these machines, when ordered, for threading bolts and tapping nuts, $1\frac{1}{4}$ inches, and smaller sizes, at an additional cost.

GEARED SOLID DIE STOCK.

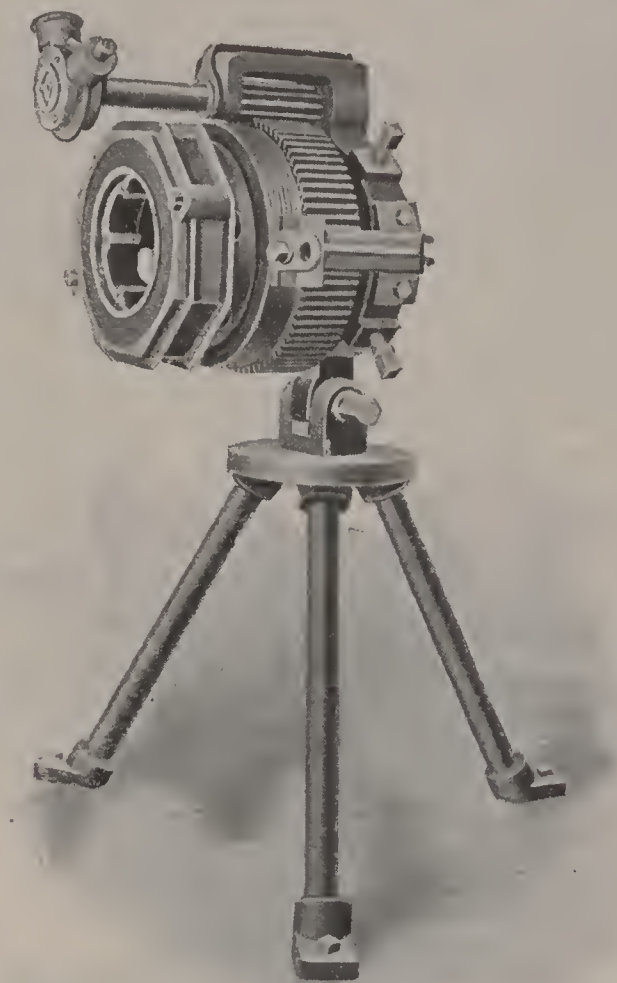


Fig. 311

PRICE LIST.

COMPLETE MACHINES.—Fig. 311.

No.	Range.	DIES.	Shipping Weight.	Price.
A	1/2 to 2 inch	1/2, 3/4, 1, 1 1/4, 1 1/2, 2	100 lbs.	\$ 75.00
B	1 to 3 inch	1, 1 1/4, 1 1/2, 2, 2 1/2, 3	150 lbs.	100.00
C	2 1/2 to 4 inch	2 1/2, 3, 3 1/2, 4	250 lbs.	120.00
D	1 1/2 to 4 inch	1 1/2, 2, 2 1/2, 3, 3 1/2, 4	275 lbs.	135.00
E	1 to 4 inch	1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4	300 lbs.	160.00
F	2 1/2 to 6 inch	2 1/2, 3, 3 1/2, 4, 5, 6	400 lbs.	215.00
G	5 to 8 inch	5, 6, 7, 8	600 lbs.	300.00

Price includes tripod stand, ratchet, dies, bushings, wrenches and all complete.

A, B, D, E, are regularly made with the compound lever direct-acting feed. C, F, G, are regularly made with the leader-screw feed.

For Pipe Rest, add to A, B, C, D, E, \$4.00; F, \$5.00; G, \$6.00.

For Nipple Holder, add to A, \$15.00.

For Crank, add \$2.00.

If without legs and feet, deduct from A, \$2.00; B, \$3.00; C, D, E, \$4.00; F, \$5.00; G, \$6.00.

NOTE.—Bolt holes are drilled equi-distant between the three pipe leg bosses on all flanged tripod tops, so any machine can be removed from the tripod floor stand and bolted for use on a regular work bench, if so preferred.

PIPE STOCK SAND DIES.



Figure 312.
Armstrong Stock and Dies, No. 1.

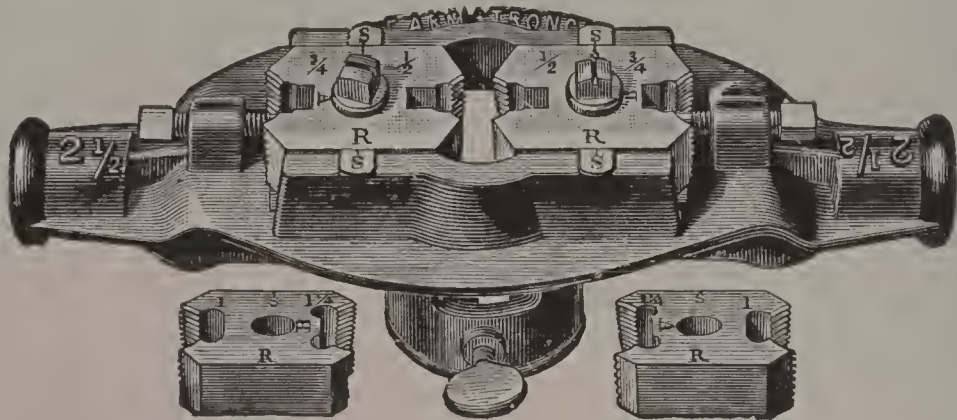


Figure 313.
Armstrong Stock and Dies, No. 2 1/2.
Armstrong's Adjustable Stock and Dies.—Figures 312 and 313.

No.	Threads.	Complete.	Stock Only.	Extra Dies.	Extra Bushings.	Extra Wrenches.
No. 1, 4 Dies, Single End . .	$\frac{1}{8}$ to $\frac{1}{2}$	9.00	3.25	1.25	.20	.25
No. 2, 5 Dies, Single End . .	$\frac{1}{4}$ to 1	12.00	4.00	1.50	.25	.25
No. 2 1/2, 4 Dies, Double End	$\frac{1}{2}$ to 1 1/2	12.00	4.50	3.25	.40	.25
No. 3, 3 Dies, Single End . .	1 1/4 to 2	20.00	7.00	4.00	.50	.50
No. 4, 3 Square Dies	1 1/4 to 2	18.00	7.00	3.00	.50	
No. 6, 2 Dies, Double End .	2 1/2 and 3	40.00	25.00	15.00	1.00	.50
No. 7, 8 Dies, Double End .	2 1/2 to 4	60.00	30.00	16.00	1.50	.75

Prices for Dies mean per set of 2 Pieces.
NOTE:—No. 4 Stock is a sectional stock.
Nos. 2 1/2, 6 and 7 Stocks are fitted with double-ended dies.
Nos. 1 and 2 Stocks are packed in cases, as shown by Fig. 312.
Nos. 6 and 7 have four arms.

DIE PLATES.

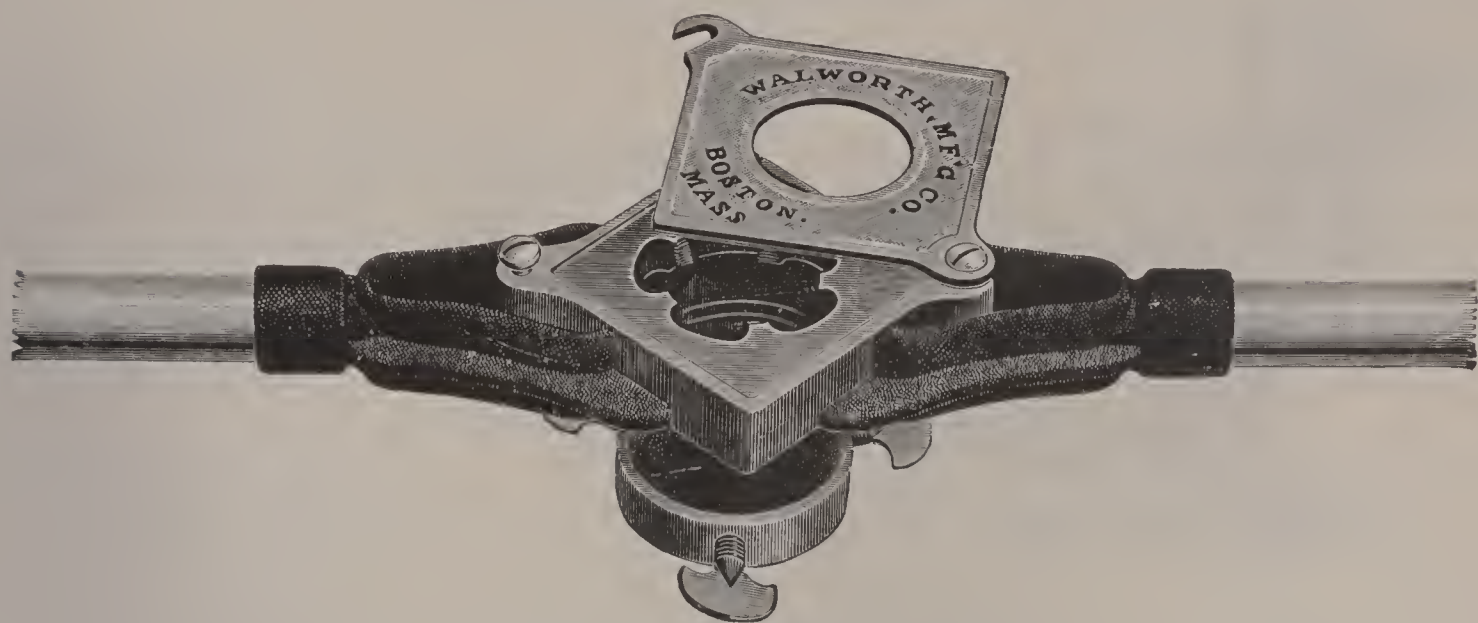


Figure 314.
Die Plate, No. 2.

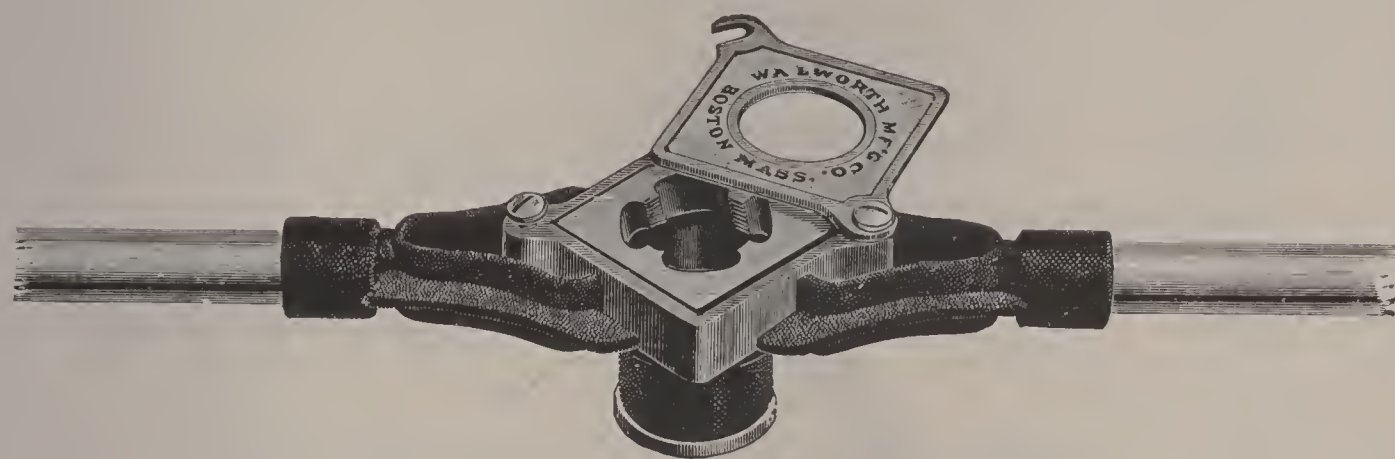


Figure 315.
Die Plate, Nos. 0 to 1 3/4.

DIE PLATES.

NO.	00 Brass Pipe.	0	1	1½	1¾	2	3 2 arm.	4 4 arm.
THREADS	5/8, 3/4, 7/8, 1, 1 1/4	1/8 to 1/2	1/4 to 1	3/4 to 1 1/4	1 to 1 1/2	1 1/4 to 2	2 1/2 and 3	2 1/2 and 3
SIZE DIES	2 x 1/2	2 x 1/2	2 1/2 x 3/4	3 x 3/4	3 x 3/4	4 x 7/8	5 x 1 1/4	5 x 1 1/4
DIE PLATES ONLY.	3.50	3.50	5.00	6.00	6.00	9.50	25.00	33.00
DIE PLATES COMPLETE, WITH HILL'S DIES.....	13.50	9.50	15.00	13.50	13.50	20.00	43.00	51.00
DIE PLATES COMPLETE WITH "RUFF & TUFF" DIES	16.75	11.50	18.25	16.00	16.00	23.50	49.00	57.00
EXTRA HILL'S DIES	2.00	1.50	2.00	2.50	2.50	3.50	9.00	9.00
EXTRA "RUFF & TUFF" DIES. ....	....	2.00	2.75	3.35	3.35	4.75	12.00	12.00
EXTRA BUSHINGS	.25	.25	.35	.45	.45	.60	1.00	1.00
EXTRA DIE FRAMES.....	....	....	.30	.40	.40	.50	.60	.60
HILL'S DIES FOR PLUMBERS' BRASS PIPE ....	....	2.00	2.50	3.00	3.00	4.00	....	....

No. 2 and larger have leader screw.

PATENT PIPE VISE.

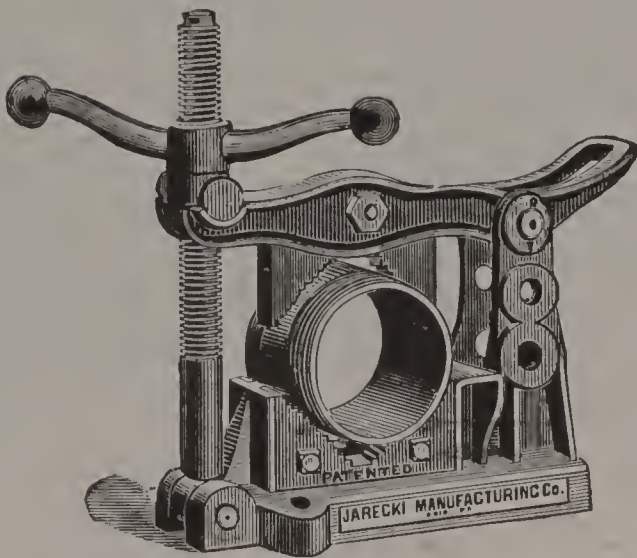
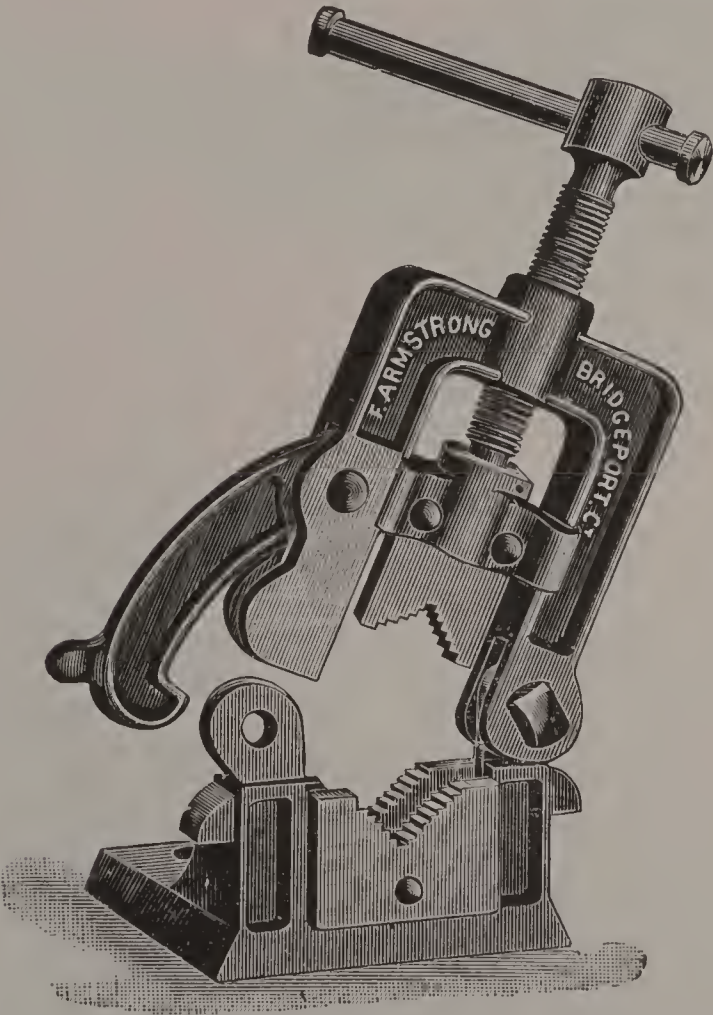


Figure 316.

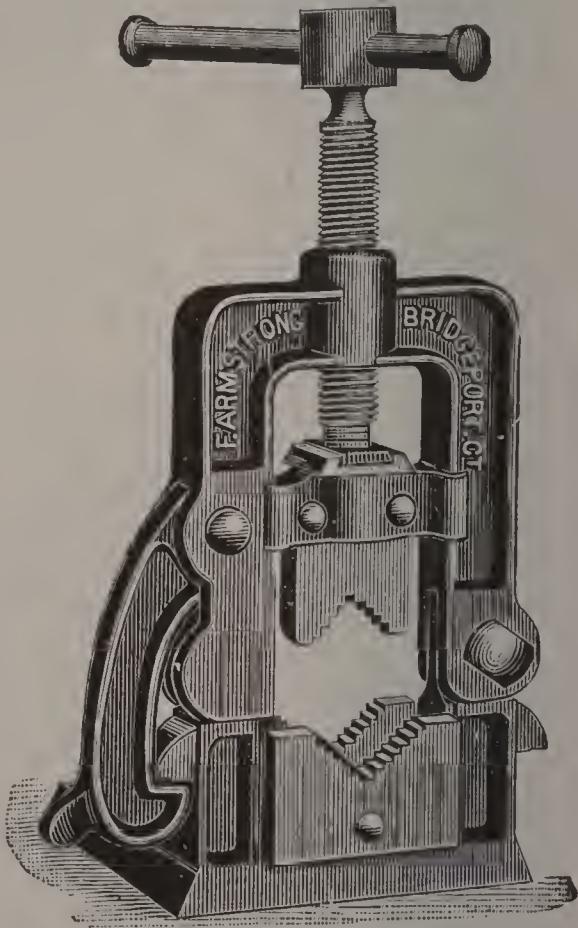
Number.....	1	2	3	4
Takes.....	1 ¹ / ₈ to 2	1 ¹ / ₈ to 4	1 ¹ / ₂ to 6	6 to 12
Price	12 00	16 00	24 00	60 00
“ Beam.....	1 25	1 50	2 50	
“ Handle	1 00	1 00	1 50	
“ Trunnion Washer....	50	50	75	
“ Jaws, each...	1 00	1 50	2 00	
“ Screw	2 25	2 50	4 25	
“ Frame.....	4 00	6 00	9 00	

It will be seen by referring to the above cut of this Vise that the Beam which holds the upper Jaw is hinged. By this improvement the pipe can be placed in the Vise at any point. The side opening has other advantages, that the Vise may be used for holding pipes while fittings are screwed on one or both ends, or for taking apart old pipe work.

HINGED PIPE VISES.



(Open.)



(Closed.)

Figure 317.

The above cuts represent a view of the new Improved Hinged Vises. They are so simple in construction that any further explanation is unnecessary. They are of the best Malleable Iron, and are made on the interchangeable system, so that any of the parts can be replaced, if it should become necessary.

No. 1 will hold from 0 to 2 ¹ / ₂ -inch pipe	Price, \$10 00
No. 2 will hold from 1/2 to 4 ¹ / ₂ -inch pipe	Price, 20 00

PIPE CUTTERS.

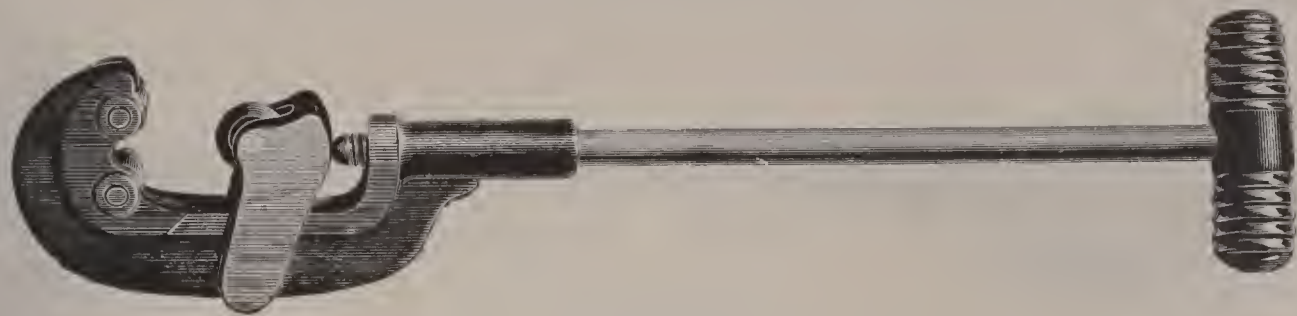


Figure 318.

Saunders Pipe Cutters.—Fig. 318

No.	1	2	3
Cuts pipe	$\frac{1}{8}$ to 1	1 to 2	2 to 3
Each	3.00	4.50	11.00
Extra blocks and wheels, each.....	1.25	1.75	2.75
Extra wheels, each	.24	.32	.60
Extra rollers, each	.24	.32	.50

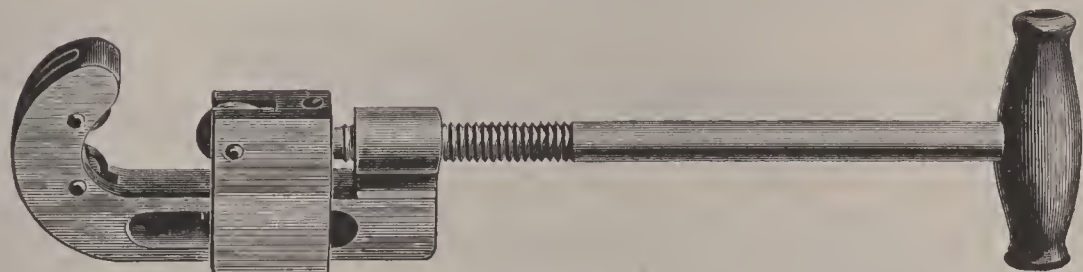


Figure 319.

Barnes 3-Wheel Pipe Cutters.—Fig. 319

No.	1	2	3	4	5	6	7
Cuts pipe	$\frac{1}{8}$ to 1	$\frac{1}{2}$ to 2	$1\frac{1}{2}$ to 3	$2\frac{1}{2}$ to 4	4 to 6	6 to 8	9 to 12
Each	4.50	6.00	10.00	20.00	30.00	40.00	50.00
Extra wheels, each.....	.25	.30	.40	.50	.75	.75	.75
Extra wheel pins, per doz..	1.00	1.00	1.00	2.00	2.00	2.00	2.00

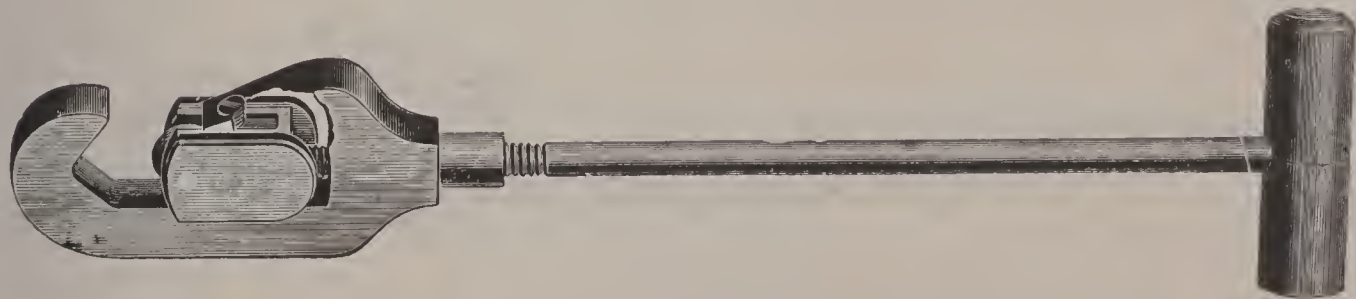


Figure 320.

Stanwood Improved Pipe Cutters.—Fig. 320

No.	1	2	3
Cuts pipe	$\frac{1}{8}$ to 1	$\frac{3}{4}$ to 2	2 to 3
Each	1.50	2.25	7.00
Extra blocks and wheels, each.....	.45	.60	1.25
Extra wheels, each	.12	.18	.25
Pins, each	.05	.05	.08

PIPE CUTTERS (Continued).



Figure 321.

C. C. Walworth's Improved Pipe Cutters.—Fig. 321

No.	1	2	3
Cuts pipe	1/8 to 1	3/4 to 2	2 to 3
Each	1.50	2.25	7.00
Extra blocks and wheels, each.....	.60	.90	1.50
Extra wheels, each	.12	.18	.25

PIPE WRENCHES.



Figure 322.

Stillson Wrench, Wood Handle,
6 to 18 inches.



Figure 323.

Stillson Wrench, Steel Handle,
6 to 14 inches.

Stillson Wrenches.—Fig. 322 and 323

Length when open	6	8	10	14	18
Grips {	1/8 wire	1/8 wire	1/8 wire	1/4 wire	1/4 wire
to	to	to	to	to	to
1/2 pipe	3/4 pipe	1 pipe	1 1/2 pipe	2 pipe	
Each	2.00	2.00	2.25	3.00	4.00

6-inch Wrench with Screw Driver attachment on end of handle. Finished, each, \$2.37, Nickel Plated, \$2.75.

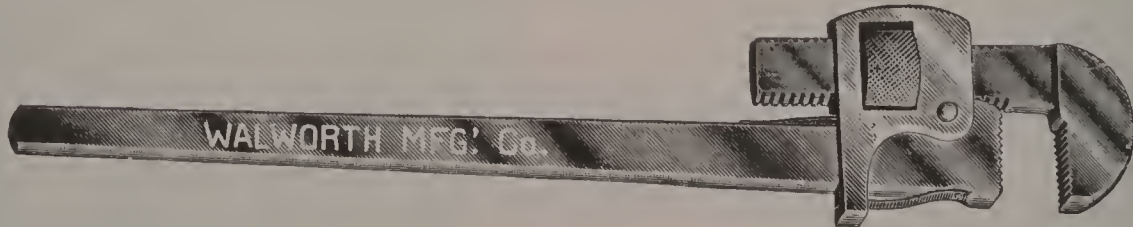


Figure 324.

Stillson Wrench, 18 to 48 inches.

Stillson Wrenches.—Fig. 224

18 to 48 inches.

Length When Open.	18	24	36	48
Grips {	1/4 wire	1/4 wire	1/4 pipe	1 pipe
to	to	to	to	to
2 pipe	2 1/2 pipe	3 1/2 pipe	5 pipe	
Each.....	4.00	6.00	12.00	18.00

PIPE WRENCHES (Continued).



Figure 325.

Stillson Jaw.

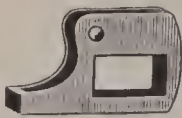


Figure 326.

Stillson Frame.



Figure 327.

Stillson Handle.



Figure 328.

Stillson Nut.

Repairs for Stillson Wrenches.

Size	6	8	10	14	18	24	36	48
Jaws, each	.67	.67	.75	1.00	1.33	2.00	4.00	6.00
Frames, each	.25	.25	.33	.45	.55	.65	.75	1.00
Wood handles, each	.15	.15	.20	.25	.30	...	...	...
Steel handles, each	.66	.66	.78	1.00	1.33	2.00	4.00	6.00
Nuts, each	.20	.20	.27	.35	.42	.50	.65	.80

PIPE TONGS

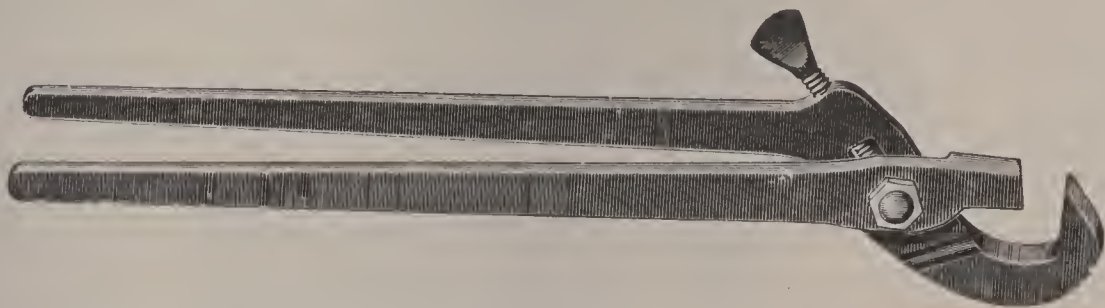


Figure 329.

Adjustable Tongs.—Fig. 329

No.	1	1½	2	3	4	5	6	7
For pipe	⅛ to ¾	⅜ to 1	½ to 1¼	1 to 2	1½ to 3	2½ to 4	3 to 5	4 to 7
Each	1.30	1.65	2.00	3.00	6.00	11.00	25.00	35.00

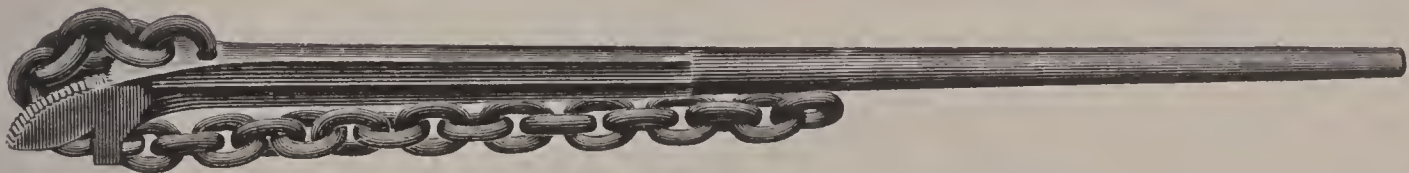


Figure 330.

Chain Tongs.—Fig. 330

No.	2	3	4	5	6	7
Length of lever, inches.....	27	36	48	60	72	84
Size of chain	⅝	⅝	¾	½	⅝	¾
Weight, pounds	7	12	24	33	50	100
For pipe	1 to 2	1¼ to 4	2 to 6	2½ to 8	4 to 10	4 to 16
Each	5.50	6.25	9.00	12.50	16.00	30.00

PIPE TAPS, REAMERS AND DRILLS.

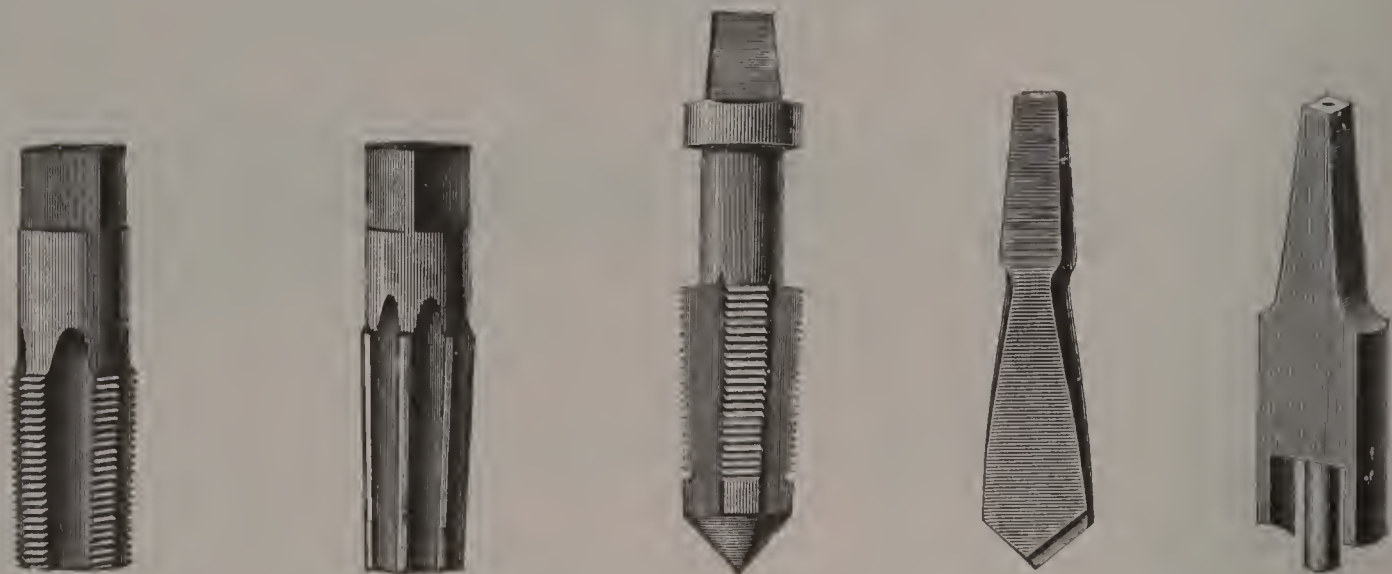


Figure 331. Pipe Tap. Figure 332. Pipe Reamer. Figure 333. Combined Tap, Reamer, and Drill. Figure 334. Pipe Drill. Figure 335. Counter Bore

Pipe Taps, Reamers, and Drills.—Figs. 331, 332, 333, 334 and 335.

Size.....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Fig 334. Taps....	1.12	1.25	1.50	1.87	2.50	3.12	3.75	4.62	6.25	10.50	15.00	42.00	50.00
Fig 335. Reamers ..		1.25	1.50	1.87	2.50	3.12	3.75	4.62	6.25	10.50	15.00	42.00	50.00
Fig 336. Comb'd Tap, Reamer & Drill		2.50	2.50	3.00	4.50	6.00	7.25	8.50	10.75	.....	.....	.....	.....
Fig. 337. Drills... ..	.75	.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.75	4.75	.....	.....
Fig. 338. Counter Bores.....	....	....	....	....	....	3.50	4.00	5.00	6.00	.....	.....	.....	.....

WRENCHES.

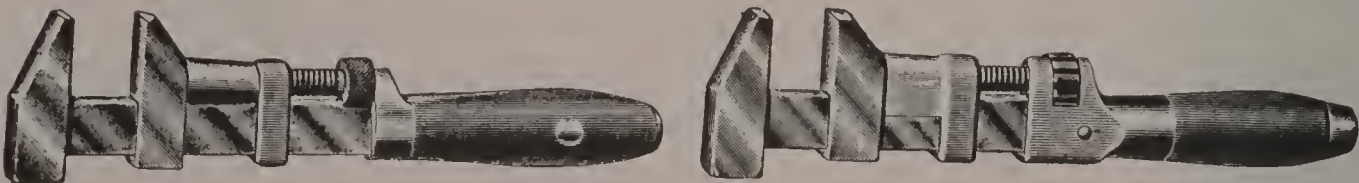


Figure 336. Figure 337.

Coe's Wrenches.—Fig. 336

Size	6	8	10	12	15	18	21
Black, per dozen	9.00	10.00	12.00	14.00	24.00	30.00	36.00
Bright, per dozen	10.00	11.00	14.00	16.00	26.00	32.00	38.00

Engineers' Wrenches.—Fig. 337

Size	6	8	10	12	15	18	21
Black, per dozen	9.00	10.00	12.00	14.00	24.00	30.00	36.00
Bright, per dozen	10.00	11.00	14.00	16.00	26.00	32.00	38.00

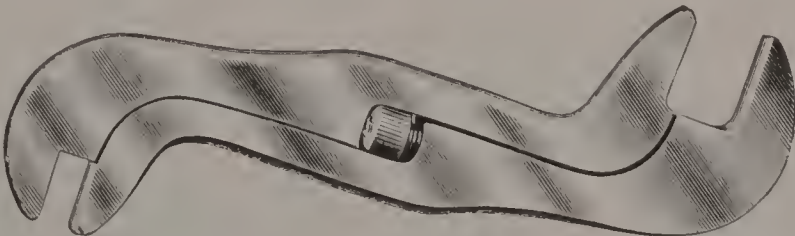


Figure 338.

Baxter "S" Wrenches.—Fig. 338

Size	4	6	8	10	12
Each	.50	.75	1.00	1.50	2.00

HACK SAWS.

[illegible]

Hack Saw Blades.

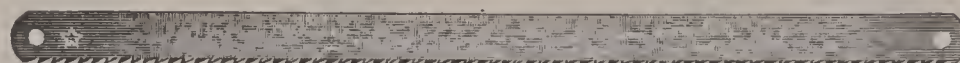


Figure 340.							
Length, inches	6	7	8	9	10	11	12
Per dozen	.55	.60	.65	.70	.85	.95	1.05

WATER GAUGE COLUMNS.

WATER COLUMNS FOR WATER GAUGES AND GAUGE COCKS.

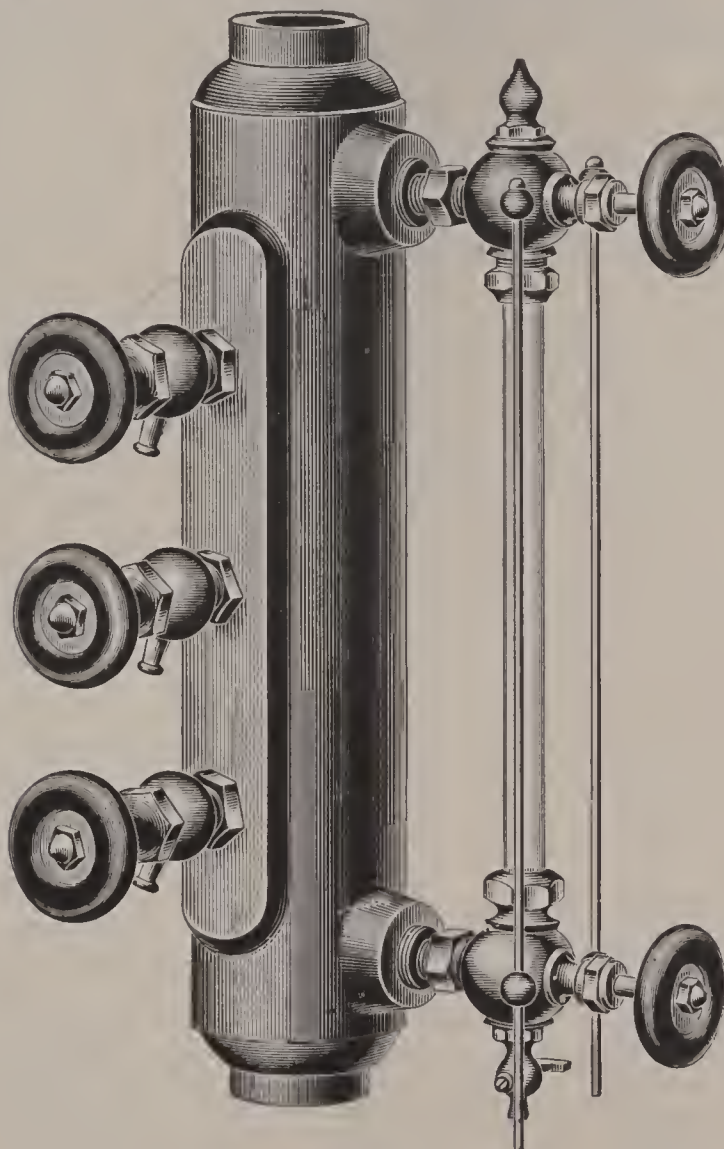


Figure 341.

PRICES:—Not including Water Gauge or Gauge Cocks.

[illegible]

GAUGE COCKS.

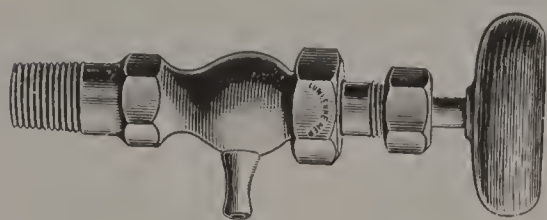


Figure 342.

Regrinding Gauge Cock.

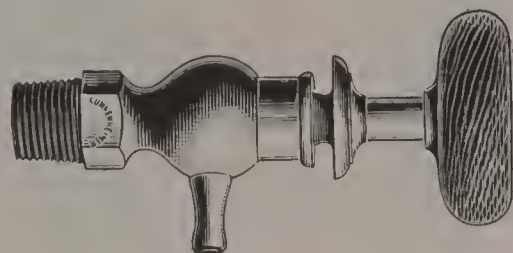


Figure 343.

Soft Seat Compression Gauge Cock. Plain.

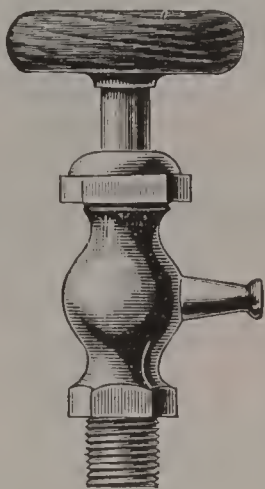


Figure 344.

Soft Seat Compression Gauge Cock, with Stuffing-Box.



Figure 345.

Ball Gauge Cock.

PRICE LIST.

Number.....	00	0	1	2	3	4
Size Blank Shank..... inch	1/2	5/8	3/4	1	7/8	1
Cut for Pipe Thread.... inch	1/4	3/8	1/2	3/4	1/2	3/4
Fig. 342. Regrinding Compression Gauge Cock, each.....	90	1 05	1 30	1 80	.....	.....
Fig. 343. Soft Seat Compression Gauge Cock, each.....	80	90	1 00	1 10	.....	.....
Fig. 344. Soft Seat, with Stuffing-box..each	1 00	1 10	1 20	1 30	.....	.....
Fig. 345. Ball Gauge Cock.....each	.....	.....	.....	.....	90	1 00

GENUINE SCOTCH GLASS TUBES.
Price Per Dozen.

LENGTH.	EXTERNAL DIAMETER.			
INCHES	1/2 & 5/8	3/4	7/8	1
10	3.00	3.60	5.04	6.12
11	3.24	3.96	5.64	6.72
12	3.60	4.32	6.12	7.32
13	3.84	4.80	6.60	7.92
14	4.20	5 16	7.08	8.52
15	4.44	5.52	7.56	9.12
16	4.80	5.88	8.16	9.72
17	5.04	6.24	8.64	10.32
18	5.40	6.60	9.12	10.92
19	5.64	7.08	9.60	11.52
20	6.00	7.44	10.20	12.12
22	6.60	8.16	11.16	13.44
24	7.20	8.88	12.12	14.64
30	9.00	11.16	15.24	18.24
36	10.80	13.44	18.24	21.96
48	14.52	18.00	24.36	29.16
60	18.12	22.56	30.48	36.48
72	21.84	27.12	36.48	43.80

60 x 1 1/4 inch, \$60.00.

WATER GAUGES.

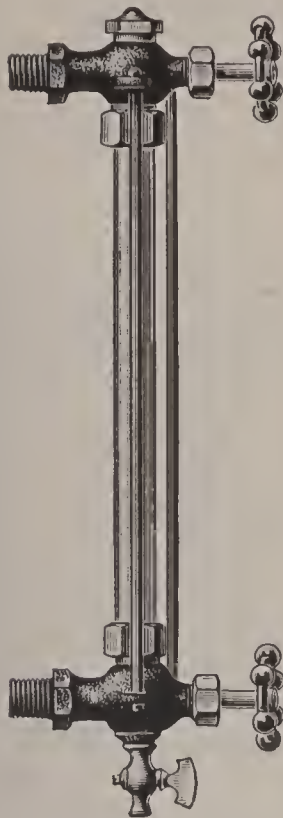


Figure 346.
Two-Rod.

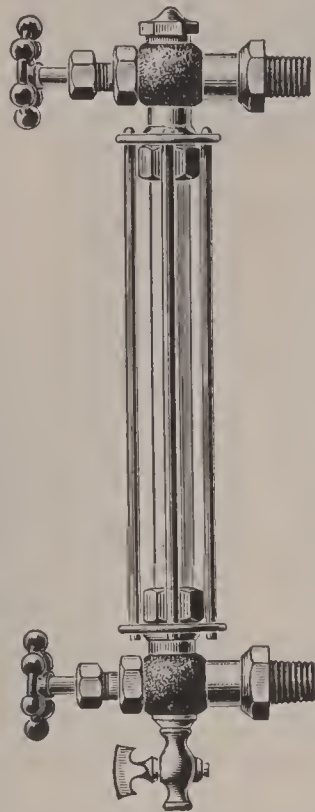


Figure 347.
Three-Rod.
With Regrinding Valves.

PRICE LIST.

Two-Rod.

Two-Rod Part Finished, Bronzed Body, $\frac{5}{8}$ Glass, $\frac{1}{2}$ -inch Pipe, Each,	\$ 3 00
Two-Rod Part Finished, Bronzed Body, $\frac{3}{4}$ Glass, $\frac{3}{4}$ -inch Pipe, Each,	6 00
Two-Rod All Finished, $\frac{5}{8}$ Glass, $\frac{1}{2}$ -inch Pipe	Each, 3 75
Two-Rod All Finished, $\frac{3}{4}$ Glass, $\frac{3}{4}$ -inch Pipe	Each, 8 00

Three-Rod.

Three-Rod Part Finished, Bronzed Body, $\frac{1}{2}$ Glass, $\frac{3}{8}$ -inch Pipe, Each,	\$ 3 50
Three-Rod Part Finished, Bronzed Body, $\frac{5}{8}$ Glass, $\frac{1}{2}$ -inch Pipe, Each,	4 00
Three-Rod All Finished, $\frac{5}{8}$ Glass, $\frac{1}{2}$ -inch Pipe	Each, 5 00
Three-Rod Part Finished, Bronzed Body, $\frac{3}{4}$ Glass, $\frac{3}{4}$ -inch Pipe, Each,	8 00
Three-Rod All Finished, $\frac{3}{4}$ Glass, $\frac{3}{4}$ -inch Pipe	Each, 9 50

Four-Rod.

Four-Rod Part Finished, Bronzed Body, $\frac{5}{8}$ Glass, $\frac{1}{2}$ -inch Pipe, Each,	\$ 5 00
Four-Rod All Finished, $\frac{5}{8}$ Glass, $\frac{1}{2}$ -inch Pipe	Each, 6 50
Four-Rod Part Finished, Bronzed Body, $\frac{3}{4}$ Glass, $\frac{3}{4}$ -inch Pipe, Each,	8 50
Four-Rod All Finished, $\frac{3}{4}$ Glass, $\frac{3}{4}$ -inch Pipe	Each, 10 00

These Water Gauges have a plug in top for replacing glass tube.

PLAIN ENGINE LUBRICATOR.

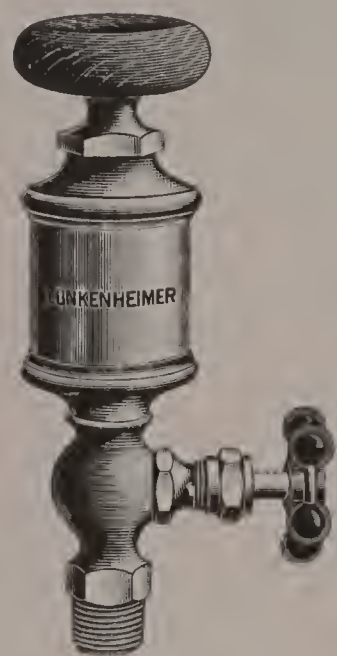


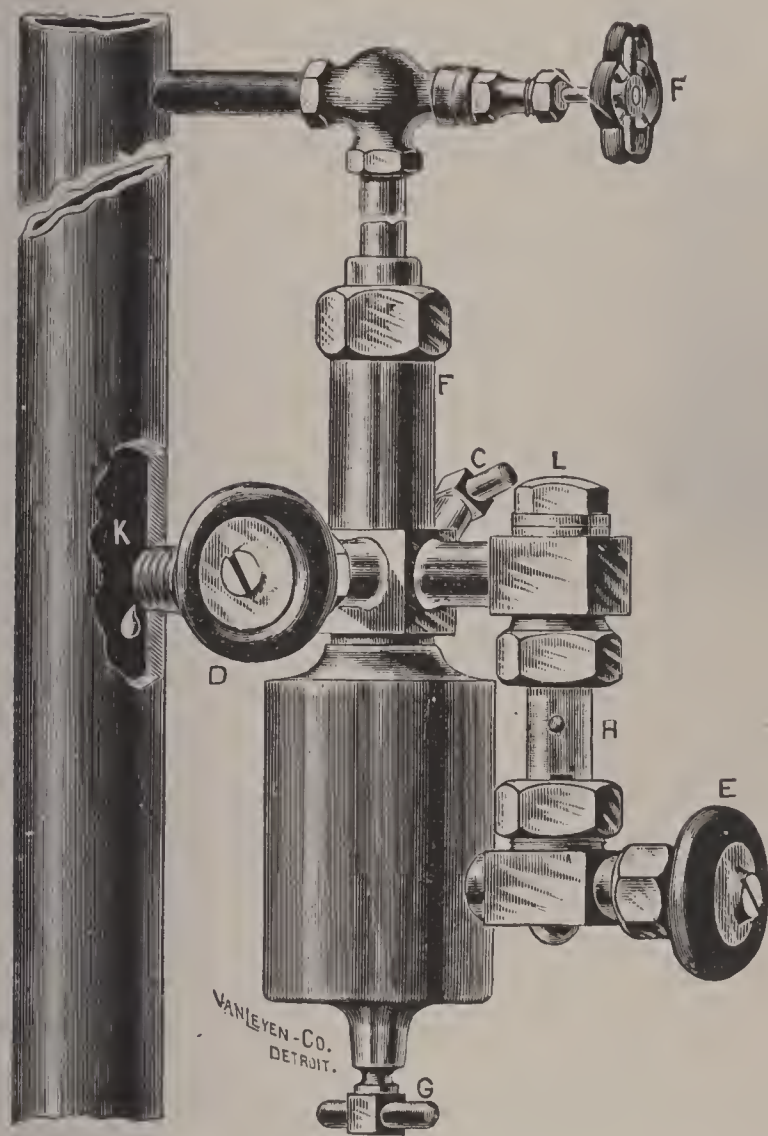
Figure 348.

Price List.

Number, ...	00	0	1	2	3	4	5	6	7	8
Diameter, { inches }	1	1¼	1½	1¾	2	2¼	2½	3	3½	4
Capacity, { ounces }	¾	1	1¼	1½	2½	4	5	10	18	24
Pipe Thread, { inch }	¾	¾	¾	½	½	½	½	¾	¾	¾
Plain each	2 00	2 20	2 40	2 60	2 90	3 25	3 75	4 75	7 00	10 00
Plain with Cock and tube, each	3 00	3 20	3 40	3 60	3 90	4 25	4 75	5 75	8 00	11 00

THE “DETROIT.”

DOUBLE CONNECTION AUTOMATIC SIGHT-FEED LUBRICATOR
(Without Gauge Glass) FOR STATIONARY ENGINES.



- C. Filler Plug.
- D. Water Valve.
- E. Feed Valve.
- FF. Condenser and Steam Connections.
- G. Drain Valves.
- H. Sight Feed Glass.
- K. Oil Discharge Pipe.
- L. Plug to insert glass.

When ordering repairs give number of Lubricator.

Figure 349.

PRICE LIST.

Size.. For Cylinder.	$\frac{1}{4}$ Pint. Up to 5 inch.	$\frac{1}{3}$ Pint. 5 to 8 inch.	$\frac{1}{2}$ Pint. 8 to 12 inch.	1 Pint. 12 to 20 inch.	1 Quart. 20 in. and over.
Brass Finish..	\$15 00	\$17 00	\$20 00	\$28 00	\$42 00
Nickel Plated	18 00	20 00	23 00	32 00	47 00

Size of Glasses used.

$\frac{3}{4}$ x $2\frac{1}{8}$	$\frac{3}{4}$ x $2\frac{1}{8}$	$\frac{3}{4}$ x $2\frac{1}{8}$	$\frac{3}{4}$ x 3	$\frac{3}{4}$ x 3
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THE "DETROIT."

Improved Standard Sight-Feed Lubricator, for Stationary Engines.

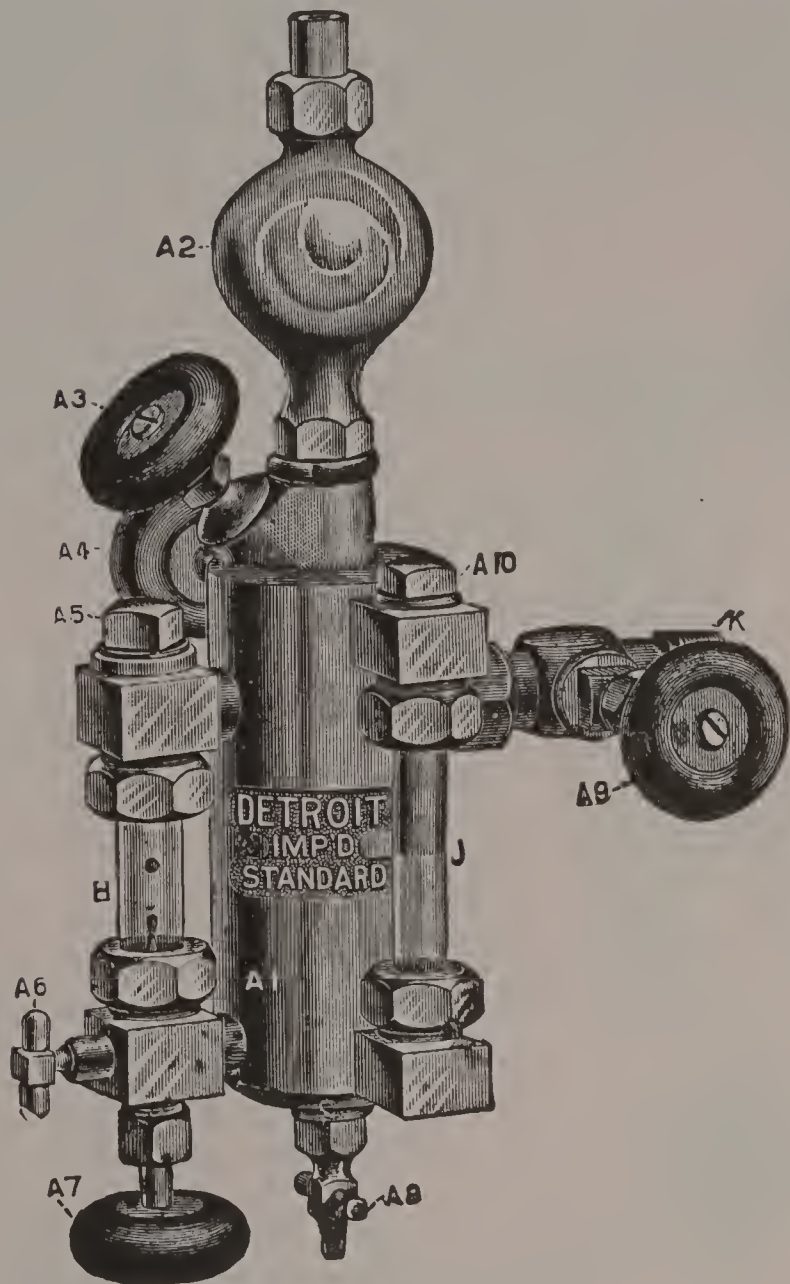


Figure 350.

- A 1, Body or Oil Reservoir.
- A 2, Condenser.
- A 3, Filler Plug.
- A 4, Water Feed Valve Stem.
- A 5, Plug for inserting Sight-Feed Glass.
- A 6, Sight-Feed Glass Drain Stem.
- A 7, Sight-Feed Regulating Valve Stem.
- A 8, Drain Valve.
- A 9, Globe Valve in Support arm.
- A 10, Plug for inserting Gauge Glass.
- H, Sight Feed Glass.
- J, Gauge Glass.
- K, Connection to Steam Pipe.

Valve in Support Arm should be in horizontal position as shown in cut when Lubricator is attached to Steam pipe.

PRICE LIST.

Size For Cylinder.....	$\frac{1}{2}$ Pint. Under 10 in	$\frac{1}{2}$ Pint. 10 to 12 in.	1 Pint. 12 to 18 in.	1 Quart 18 to 30 in.	$\frac{1}{2}$ Gal. 30 in. & over	1 Gal.
Brass Finish.....	\$ 17 00	\$ 22 00	\$ 30 00	\$ 45 00	\$ 60 00	\$ 75 00
Nickel Plated	20 00	25 00	35 00	50 00	65 00	80 00

Size of Glasses Used.

Sight Feed.....	$\frac{5}{8}$ x 2	$\frac{3}{4}$ x 3	$\frac{3}{4}$ x 3	$\frac{3}{4}$ x $3\frac{1}{4}$	$\frac{3}{4}$ x $3\frac{1}{4}$	$\frac{3}{4}$ x $3\frac{1}{4}$
Gauge	$\frac{5}{8}$ x 2	$\frac{5}{8}$ x $3\frac{1}{4}$	$\frac{5}{8}$ x $4\frac{1}{8}$	$\frac{5}{8}$ x $4\frac{3}{8}$	$\frac{5}{8}$ x $6\frac{3}{4}$	$\frac{5}{8}$ x $9\frac{3}{4}$

Write for prices. The above list subject to liberal discount. Over 200,000 of these Lubricators in actual use.

When ordering repairs give number of Lubricator.

“ IDEAL ” AUTOMATIC GREASE CUP.

FOR ENGINE CRANK PINS, JOURNALS, ETC.



Figure 351.

The “Ideal” is a first-class cast brass highly finished automatic compression cup, suitable for engine bearings, journals, etc. It is provided with a leather packed plunger (insuring a tight joint and smooth working), which is so constructed that it is easily raised when cup requires recharging with grease. The spring and plunger are conveniently controlled by thumb-nut, which is provided with an automatic lock arrangement to prevent its jarring from position on stem. The hole through the shank can be regulated to suit the grease used, by means of regulating screw. As a high grade cup of superior design and perfect regulation of feed, the “Ideal” has no equal.

PRICE LIST.

Number	00	0	1	2	3	4
Inside Diameter inches	1	1¼	1½	2	2½	3
Extreme outside diameter..... .. inches	1½	1¾	2	2⅞	3⅜	3⅝
Extreme Height over all (plunger raised, cup open) } inches	3½	4½	5⅜	6⅜	7½	8⅜
Shank Pipe Thread inch	⅛	¼	¼	⅜	½	½
Capacity (Grease) ounces	⅓	1	1½	3	6	10
Finished Brass each	1 50	2 00	2 50	3 20	4 30	6 00
Nickle Plated each	1 75	2 25	2 80	3 60	5 00	6 75

“ PIONEER ” SLIDE TOP GLASS OIL CUP.



Figure 352.

The “Pioneer” Oil Cups have become an “acknowledged standard,” being by far the best designed and constructed, and consequently the most perfect oilers of their class and are adapted for all Engine and Machinery Bearings where it is desirable to use a first-class cup. They are made of cast brass (not spun brass), are highly finished, compact and very ornamental. These, and the other styles of glass oil cups, manufactured by us, are the only ones on the market which will not come apart when placed on jarring machinery, neither will the feed unset nor slide loosen thereby spilling the oil. These excellent features being exclusive with our cups and covered by patents gives them a very considerable prestige over all other makes. They are easily filled and regulated and are satisfactory to users in every respect. They are especially adapted for Traction Engines, Steam Rollers and other machinery of like character where it is necessary to use a durable and substantial oiler.

PRICE LIST.

NUMBER	000	00	0	1	1½	2	3	4	5	6
Extreme Outside Diameter } of Cup, ... inches }	13⁄8	17⁄16	15⁄8	17⁄8	21⁄8	23⁄8	213⁄16	215⁄16	35⁄8	315⁄16
Extreme Height of Cup, } (over all) . . . inches }	23⁄4	215⁄16	313⁄16	33⁄4	41⁄16	47⁄16	43⁄4	5	6	71⁄4
Outside Diameter of Glass, } inches }	1	11⁄8	11⁄4	1½	13⁄4	2	21⁄4	2½	3	3½
Height of Glass, . . . inches	7⁄8	1	11⁄8	13⁄8	15⁄8	17⁄8	21⁄8	23⁄8	3	4
Capacity, ... ounces	¼	½	5⁄8	1	1½	2½	4	5	10	18
Shank Pipe Thread, . . inch	1⁄8	1⁄8	1⁄8	¼	¼	3⁄8	3⁄8	3⁄8	½	½
Finished Brass, . . . each	70	75	80	1 00	1 25	1 50	1 90	2 40	3 10	4 00
Nickel Plated, . . . each	80	85	95	1 20	1 50	1 75	2 20	2 75	3 50	4 50

To avoid mistakes when ordering glasses and cork washers, specify name and number of cup as stamped on same.

See page 241 for prices on extra glasses and cork washers.

“ ROYAL ” SIGHT-FEED GLASS OIL CUP.

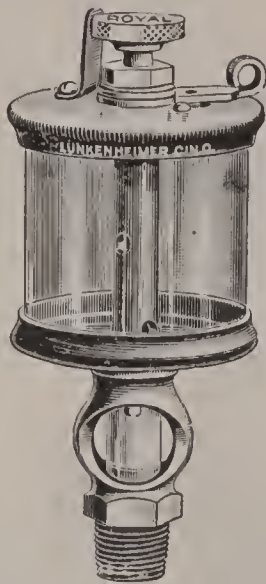


Figure 353.

The “Royal” Sight-Feed Glass Oil Cup will be found an excellent cup for engine and dynamo use. It is simple and practical, and so constructed, that when the desired feed is once set it can be stopped and started at will without resetting, the spring acting as a lock and indicator when engaging the flattened side of the thumb-nut.

Directions to set Feed.—Regulate the feed by turning the milled cover, so that when the flattened side of thumb-nut engages the spring the desired feed is obtained. When the feed is once established, it can instantly be shut off or put on by turning the milled thumb-nut, i. e., to the right, feed off; to the left, feed on.

PRICE LIST.

NUMBER	000	00	0	1	1½	2	3	4	5	6
Extreme Outside Diameter of Cup.....inches }	1⅜	1⅞	1⅝	1⅞	2⅛	2⅜	2⅞	2⅞	3⅝	3⅞
Extreme Height of Cup, (over all).....inches }	3	3⅞	3⅞	4⅜	4⅞	4⅞	5⅜	6	6⅞	7⅞
Outside Diameter of Glass inches }	1	1⅞	1¼	1½	1¾	2	2¼	2½	3	3½
Height of Glass.....inches	⅞	1	1⅞	1⅜	1⅝	1⅞	2⅛	2⅜	3	4
Capacity.....ounces	¼	½	⅝	1	1½	2½	4	5	10	18
Shank Pipe Thread.....inch	⅞	⅞	⅞	¼	¼	⅜	⅜	⅜	½	½
Finished Brass.....each	95	1 10	1 25	1 50	1 75	2 10	2 55	3 15	3 90	4 80
Nickel Plated.....each	1 05	1 20	1 40	1 70	2 00	2 35	2 85	3 50	4 30	5 30

To avoid mistakes when ordering glasses and cork washers, specify name and number of cup as stamped on same.

See page 241 for prices on extra glasses and cork washers.

GLASS BODY OIL PUMP.
PATENTED.

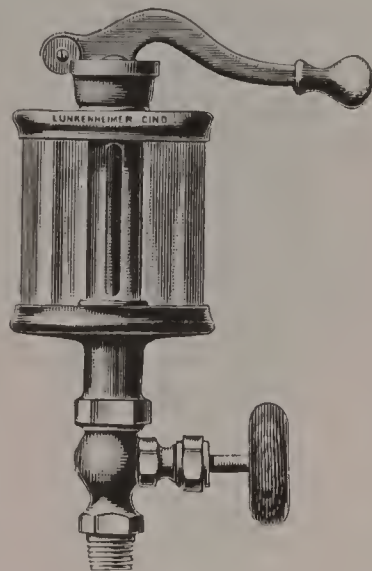


Figure 354.

The Lunkenheimer Glass Body Oil Pump is easily filled and operated and is intended to be used in connection with Sight-Feed Lubricators on Stationary or Marine Engines. No large engine should be without a cup of this kind as an auxiliary to the Sight-Feed Lubricator.

They have recently changed these pumps from two or four sizes, ranging in capacity from $\frac{1}{8}$ pint to one quart, also made changes in the design, making them much more compact and consequently neater in appearance.

Great care is exercised in the manufacture of these Pumps and they are tested thoroughly before being sent out from factory, and we guarantee them to be perfect working cups and first-class in every way.

PRICE LIST.

Size Number	3	5	6	8
Outside Diameter of Glass inches	2 $\frac{1}{4}$	3	3 $\frac{1}{2}$	4 $\frac{1}{4}$
Height of Glass inches	2 $\frac{1}{8}$	3	4	5
Capacity.	$\frac{1}{8}$ Pint	$\frac{1}{2}$ Pint	1 Pint	1 Quart
Shank Pipe Thread.....inch	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Finished Brass.....each	7 50	8 50	10 00	15 00
Nickel Plated each	8 25	9 50	11 00	16 50
Extra Glasses each	15	35	65	1 50
Extra Cork Washers..... per dozen	45	60	75	1 50

We can still furnish glasses and cork washers for old sizes, i. e., numbers one and two, and when ordering be sure and give these numbers to distinguish them from the sizes now made.

CYLINDRICAL AND URN-SHAPED GLASSES.



Figure 355.



Figure 356.

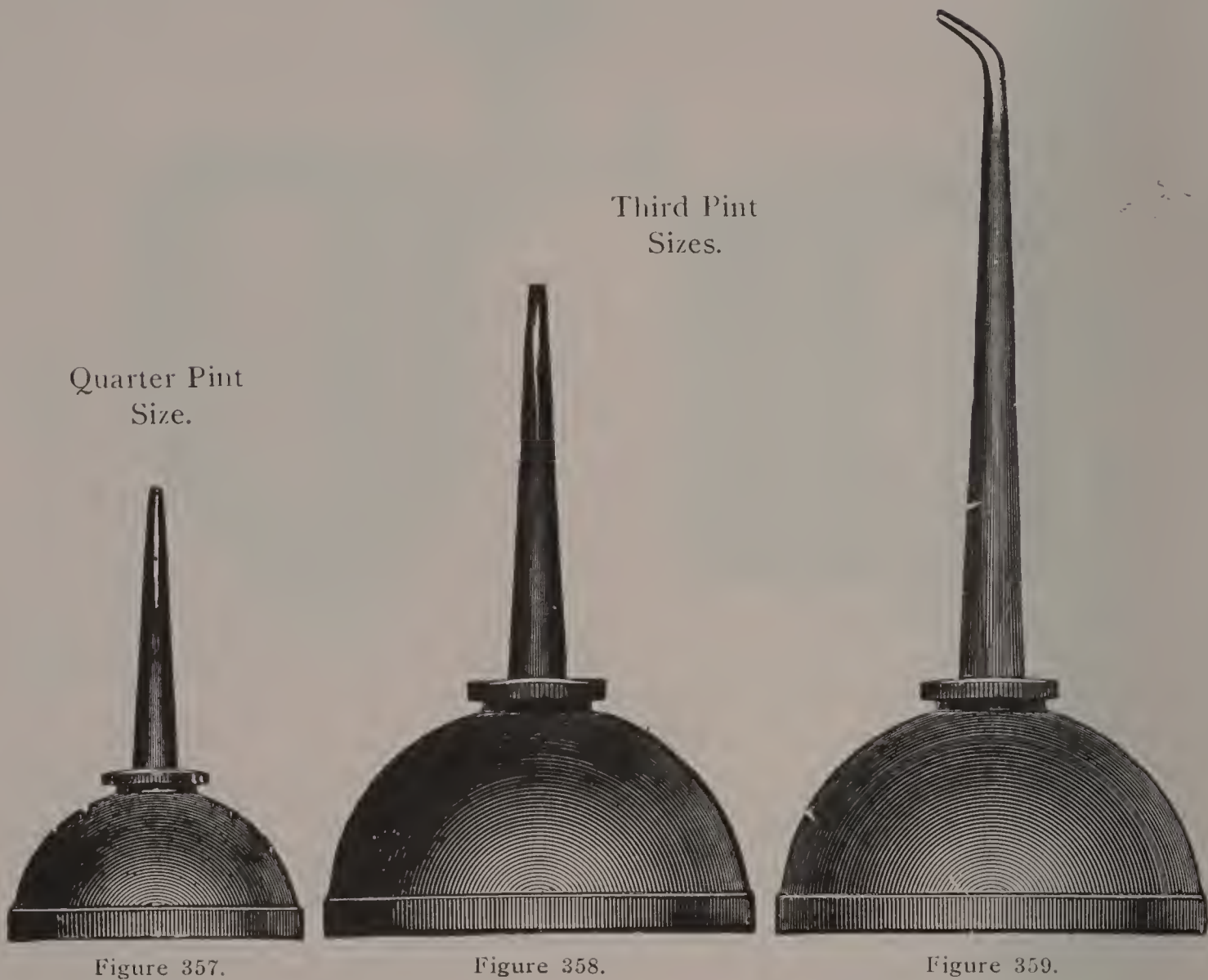
These Glasses are clear, strong and uniform in size, and interchangeable with all styles of glass cups illustrated.

PRICE LIST.

Number	000	00	0	1	1½	2	3	4	5	6	8
Outside Diameter of Cylindrical Glasses, ... inches	1	1⅛	1¼	1½	1¾	2	2¼	2½	3	3½	4¼
Height of Cylindrical Glasses, ... inches	⅞	1	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4	5
Outside Diameter at upper end of Urn-shaped Glasses, inches	...	1⅛	1¼	1½	1¾	2	2¼	2½	3	3½	.....
Height of Urn-shaped Glasses, ... inches		1½	1⅝	2	2¼	2½	2¾	3⅛	3⅝	4½	...
Cylindrical or Urn-shaped Glasses, ... each	05	06	08	10	10	12	15	25	35	65	1 50
Cork Washers per dozen	15	18	24	30	36	40	45	50	60	75	1 50

In ordering Glasses always specify whether Cylindrical or Urn-shaped are wanted.

STEEL OILERS.



WITH IMPROVED PLAIN STEEL SPRING BOTTOMS.

PRICE LIST.

		Steel, per doz.	Nickel, per doz.
Fig. 357.	Oiler, 2¾ inches diameter, 2½-inch nozzle, ¼ Pint..	\$4 50	\$6 50
Fig. 358.	Oiler, 3⅜ inches diameter, 3-inch nozzle, ⅓ Pint....	5 50	8 00
Fig. 359.	Oiler, 3⅜ inches diameter, 9-inch nozzle, ⅓ Pint....	6 50	9 20

We claim these Oilers are the best manufactured in the country, and are used by the leading machinists and railroads.

OILERS.

ENGINEERS' SETS.



Figure 360.

PRICE LIST.

Five Pieces Copperized (Counting Tray)		\$ 5 00
Six Pieces Copperized (Counting Tray)		7 00
Five Pieces Nickel (Counting Tray)		7 00
Six Pieces Nickel (Counting Tray)		10 00

UNIVERSAL DOUBLE TUBE INJECTOR.

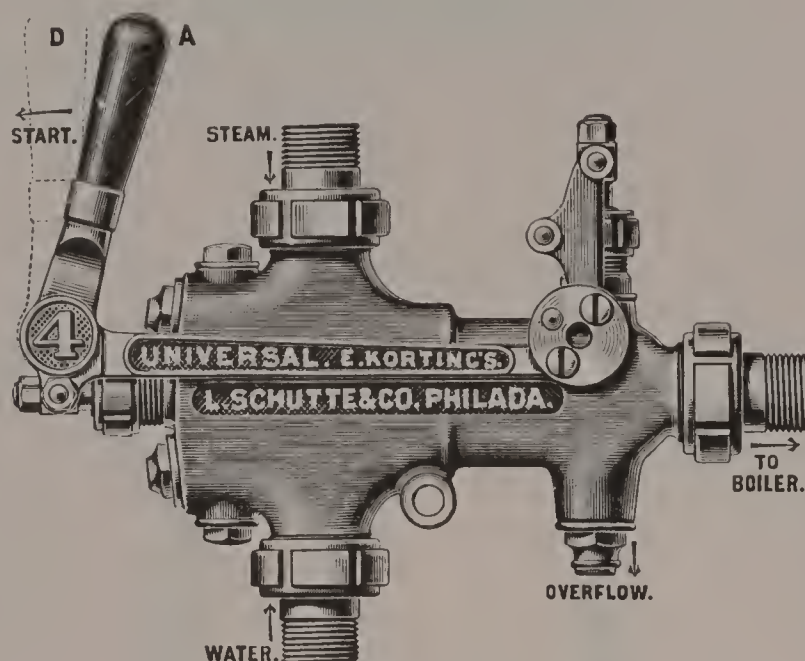


Figure 361.

DESCRIPTION.

The action of this Injector is positive; it works to the same advantage and fulfills the same duty under all circumstances; with high or low-pressure steam, hot or cold water; under pressure or suction. The instrument is a combination of two Steam Jet Apparatus, the first one proportioned for lifting and delivering the water, under some pressure, into the second one, where its velocity is sufficiently augmented to overcome the counter-pressure in the boiler.

The explanation of the proper working of the Injector, at the lowest as well as the highest steam-pressure, without adjustments of parts, is found in the fact, that the quantity of water taken in by the first apparatus, and delivered to the second one, is in proportion to the pressure of the steam, so that the first one acts as a governor for the second one.

The explanation of the feeding of hot as well as cold water is found in the construction and proportion of the first apparatus, which has a proportionately small steam nozzle, to insure high suction; and as the water is delivered to the second one under pressure, its temperature can be corresponding to this pressure, and may be delivered into the boiler ABOVE THE BOILING POINT.

At the same time the combined area of the two steam nozzles is smaller than that of other Injectors of the same capacity, so that its duty must, necessarily, be higher.

This combination of the two apparatus, and the self-governing qualities without moving parts, make the apparatus the least sensitive and most reliable for any service.

(Continued on opposite page.)

Universal Double Tube Injector (Continued).

KERTING'S UNIVERSAL DOUBLE TUBE INJECTOR.

Price List and Table of Capacities.

Size No.	Price \$.	Size of Iron Pipe.	Steam 50 lbs.		Steam 100 lbs.		Steam 150 lbs.		Size of Copper Pipe.
			Cubic Feet.	Gals.	Cubic Feet.	Gals.	Cubic Feet.	Gals.	
00	20 00	$\frac{1}{8}$	4.5	33	6.5	48	8	60	O. D. $\frac{1}{4}$
0	21 00	$\frac{1}{4}$	11	83	13.5	101	15	112	$\frac{3}{8}$
1	23 00	$\frac{3}{8}$	15	112	19	143	24	180	$\frac{1}{2}$
2	28 00	$\frac{1}{2}$	23	172	28	210	31	232	$\frac{5}{8}$
3	38 00	$\frac{3}{4}$	37	278	45	338	53	397	$\frac{7}{8}$
$3\frac{1}{2}$	46 00	$\frac{3}{4}$	53	398	63	472	73	547	$\frac{7}{8}$
4	55 00	1	71	533	83	622	96	720	$1\frac{1}{8}$
5	60 00	$1\frac{1}{4}$	90	675	107	802	123	922	$1\frac{1}{2}$
6	65 00	$1\frac{1}{4}$	110	825	132	990	150	1125	$1\frac{1}{2}$
7	85 00	$1\frac{1}{2}$	143	1072	183	1372	215	1612	$1\frac{3}{4}$
8	100 00	$1\frac{1}{2}$	185	1388	240	1800	282	2115	$1\frac{3}{4}$
9	120 00	2	225	1688	280	2100	330	2475	$2\frac{1}{4}$
10	135 00	2	270	2025	325	2438	380	2850	$2\frac{1}{4}$
12	165 00	$2\frac{1}{2}$	400	3000	485	3638	567	4252	$2\frac{3}{4}$
14	250 00	3	515	3867	618	4635	804	6030	$3\frac{1}{4}$
16	300 00	3	670	5025	810	6075	942	7065	$3\frac{1}{4}$
20	450 00	4	1200	9000	1445	10840	1670	12525	$4\frac{1}{4}$

Injectors will always be sent with nipples screwed for iron pipe, unless specified for brazing to copper pipe.

Shipment will be made by express unless otherwise instructed.

THE
METROPOLITAN AUTOMATIC INJECTOR.

Model N.

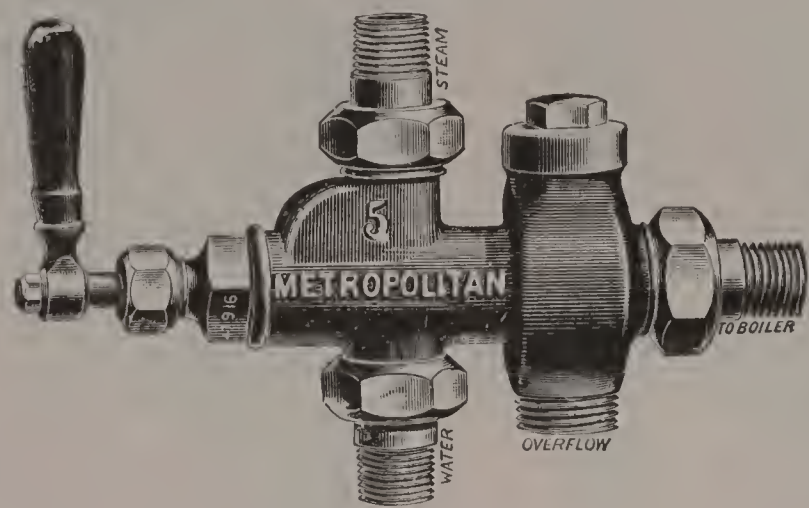


Figure 362.

PRICE LIST.

Sizes.	Prices.	Size of all Pipe Connections.	Size Overflow or Wastepipe.	Capacity with 80 lbs. Steam Pres- sure 2-ft. Lift.	Horse Power for theordi- nary Type of Boiler and Engine.	Horse Power on a Basis of 30 lbs. Evaporations per H. P. per Hour.
2	\$15 00	$\frac{3}{8}$	$\frac{3}{4}$	60 gals.	4 to 6	5 to 8
3	16 00	$\frac{3}{8}$	$\frac{3}{4}$	80 "	6 to 8	8 to 12
3½	18 00	$\frac{1}{2}$	$\frac{3}{4}$	120 "	8 to 15	12 to 20
4	20 00	$\frac{1}{2}$	$\frac{3}{4}$	165 "	15 to 20	20 to 28
5	25 00	$\frac{3}{4}$	1	250 "	20 to 30	28 to 40
6	30 00	$\frac{3}{4}$	1	350 "	30 to 45	40 to 55
7	40 00	1	1¼	500 "	45 to 65	55 to 80
8	45 00	1	1¼	600 "	65 to 80	80 to 110
9	55 00	1¼	1½	800 "	80 to 100	110 to 145
10	60 00	1¼	1½	1000 "	100 to 130	145 to 180
11	75 00	1½	2	1300 "	130 to 170	180 to 235
12	90 00	1½	2	1750 "	170 to 230	235 to 300
13	110 00	2	2½	2300 "	230 to 300	300 to 400
14	125 00	2	2½	2850 "	300 to 375	400 to 500

We send a flat strainer with each of these Injectors, sizes No. 2 to No. 10 inclusive.

THE H-D EJECTOR.

MODEL C.



Figure 363

PRICE LIST.

This list adopted June 1st, 1898.

Sizes.	Prices.	Pipe Connections.		Capacity per Hour. with 50 lbs Steam Pressure.
		Steam.	Suction and Delivery.	
No. 1 Brass	\$8.00	$\frac{3}{8}$	$\frac{1}{2}$	250 gals.
" 2 "	10.00	$\frac{1}{2}$	$\frac{3}{4}$	500 "
" 3 "	15.00	$\frac{3}{4}$	1	960 "
" 4 "	20.00	1	$1\frac{1}{4}$	1,300 "
" 5 "	25.00	$1\frac{1}{4}$	$1\frac{1}{2}$	2,000 "
" 6 Iron	35.00	$1\frac{1}{4}$	2	4,000 "
" 7 "	45.00	$1\frac{1}{2}$	$2\frac{1}{2}$	8,000 "
" 8 "	55.00	2	3	11,000 "
" 9 "	70.00	$2\frac{1}{2}$	4	15,000 "
" 10 "	175.00	4	6	45,000 "

Size No. 6 has iron body, balance brass.

Sizes Nos. 7 and 8 have iron bodies and delivery connections, balance brass

Size No. 9 has brass tubes, balance iron.

Size No. 10 has iron body, brass tubes, all connections flanged.

Sizes Nos. 6, 7, 8, 9, and 10 made entirely of brass to order.

Special all Iron Ejectors made to order.

This style Ejector will perform about the same duty as The H-D "1898" Ejector, and is advocated when an Ejector with couplings on both steam and delivery connection is desired.

EUREKA LOW PRESSURE REGULATING VALVE.

For reducing Steam, Air or Gas Pressures from the initial or high pressure carried, which may be as high as 125 pounds per square inch, down to any pressure on the reduced side less than 15 pounds, and from this point down to as low as 1 pound.



Figure 364.

The sectional illustration clearly shows the simplicity of construction of this valve. It will be noted that no springs, dash pots, auxiliary valves, drip pipes are employed, nor are there numerous small parts to maintain and keep in order.

PRICE LIST

Size Inches.	Price Each.	Face to Face Flanges Inches.	Size Inches.	Price Each.	Face to Face Flanges Inches.
3/4	\$ 20 00	4 1/2	4	\$100 00	10 3/8
1	22 00	4 1/2	5	135 00	11 3/4
1 1/4	28 00	4 3/4	6	180 00	12 3/4
1 1/2	35 00	4 3/4	7	225 00	13 1/4
2	44 00	6	8	275 00	14 1/2
2 1/2	57 00	7 1/2	9	350 00	16 1/2
3	72 00	8 1/2	10	350 00	16 1/2
3 1/2	85 00	9 1/2	12	470 00	18 1/2

Sizes 3/4 to 2 inches, inclusive, made with screw ends only; all larger have flange ends. Companion flanges are always extra and only furnished with valves when so ordered.

In ordering it is especially important that you state clearly the pressures desired to be reduced from and to what.

HIGH PRESSURE REGULATING VALVE.

For reducing Steam or Air Pressure from the initial or high pressure carried, which may be as high as 125 pounds per square inch, down to any pressure on the reduced size above 15 pounds, that may be desired.

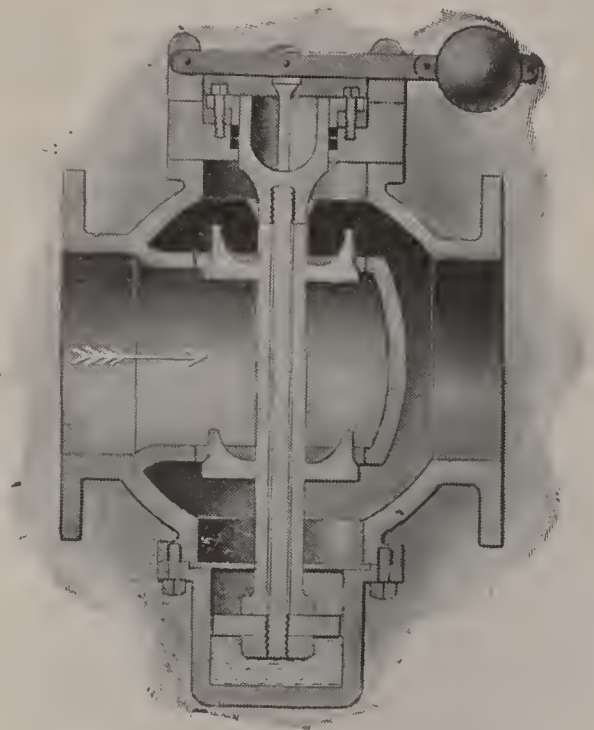


Figure 365.

From this sectional illustration it will be clearly seen that a highly desirable feature of this valve is that the actuating pressure is obtained from the reduced side. By this construction, wide variations of pressure may take place on the boiler or high pressure side, and yet at the same time we are enabled to positively guarantee to maintain an absolutely fixed pressure at any point lower than the initial, that may be desired on the low pressure side.

This valve is employed on steam heating installations where the pressure to be carried on the system exceeds 15 pounds. Also for reducing and maintaining an absolutely uniform pressure on electric light or other high speed engines and machinery demanding unvarying steam pressure. Also on Corliss and other slow speed engines, elevator engines, steam pumps or other steam appliances where a lower pressure than the highest carried will answer equally as well, if not much better, thus economizing in fuel, wear of and repairs to machinery and obtaining all-around beneficial results.

A very perfect valve for these services and guaranteed to maintain a uniform pressure within a range of 2 pounds.

PRICE LIST

Size Inches.	Price Each.	Face to Face Flanges Inches.	Size Inches.	Price Each.	Face to Face Flanges Inches.
3/4	\$20 00	4 1/2	4	\$100 00	10 1/2
1	22 00	4 1/2	5	135 00	11 3/4
1 1/4	28 00	4 1/2	6	180 00	12 3/4
1 1/2	35 00	4 1/2	7	225 00	13 3/4
2	44 00	6 1/4	8	275 00	14 1/2
2 1/2	57 00	7 1/2	9	350 00	16 1/2
3	72 00	8 1/2	10	350 00	16 1/2
3 1/2	85 00	9 1/2	12	470 00	18 1/2

Sizes 3/4 to 2 inches, inclusive, made with screw ends only; all larger have flange ends. Companion flanges are always extra and only furnished with valves when so ordered.

In ordering it is especially important that you state clearly the pressure desired to be reduced from and to what.

“ Special '98 ” Vacuum-Pressure Regulating Valve.

In modern Atmospheric, Vacuum or very low pressure Systems of Steam Heating are demanded, to insure satisfactory results, pressure regulating valves constructed especially to meet their most exacting requirements as to sensitiveness in promptly responding to the slightest fluctuation in pressure and prove capable of preserving the steam economies which are the predominant features of these systems.

That the above valve meets these conditions successfully is evidenced by their presence on nearly all installations of above systems coming under the supervision of heating engineers.

For reducing steam pressures for heating purposes only, from that carried on Boilers or Steam Heating Mains down to a point of Atmospheric Pressure or below if desirable.

Endorsed and approved by all patentees of Vacuum Systems of Steam Heating. A five-year record of service on above systems accompanied by perfect results and the best of satisfaction in every instance.

This valve is constructed with an independent diaphragm and to which is connected the actuating pressure. The pressure to govern the operation of valve is taken from the Low Pressure Heating Main, some distance from the valve itself. The exact point from which to take this connection is usually designated by the company whose system is being installed. From this point, a connection is run with valve to and connected with diaphragm of Regulator as shown in illustration.

The independent diaphragm feature of these regulating valves makes them very desirable for service where radiation is located any considerable distance from Boilers or Heating Mains, on any system of heating, as movement of valve is controlled by the pressure existing on heating apparatus.

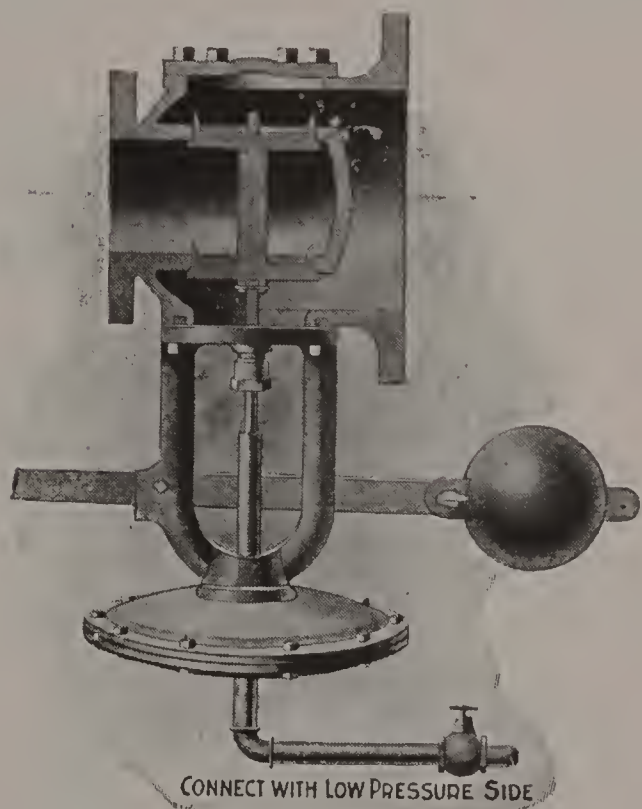


Figure 366.

PRICE LIST

Size, Inches.	Price, each.	Face to Face Flanges, inches.
1 x 2	\$ 33 00	6
1¼ x 2½	42 50	6½
1½ x 3	53 50	6½
2 x 4	72 00	6½
2½ x 5	96 00	7¾
3 x 6	126 00	8½
4 x 8	187 50	11
5 x 10	242 00	12
6 x 12	325 00	13
8 x 14	400 00	14¾

Sizes 1 x 2 to 2 x 4 inches, inclusive, made with small end screwed only and large end flanged; all larger have both ends flanged.

Companion flanges are always extra and only furnished with valves when so ordered.

In ordering it is especially important that you state clearly the pressures desired to be reduced from and to what and the system to be used on.

IMPROVED NOISELESS BACK PRESSURE VALVE.
SINGLE SEATED.

An absolutely steam tight, reliable and sensitive Back Pressure Valve of improved construction. In modern Vacuum, Atmospheric or very low pressure systems of steam heating the back pressure valve shares in importance the



Figure 367.

Horizontal Pattern.

position occupied by the Pressure Regulating Valve and equally as much care should be exercised in selecting same, as it plays a very important part in the steam economies. We strongly recommend that Back Pressure Valves be used in horizontal positions where conditions will possibly permit.

Size Inches.	Price Each.	Face to Face Flanges Inches.	Size Inches.	Price Each.	Face to Face Flanges Inches.
2	\$ 20 00	7 ¹ / ₈	6	\$ 75 00	13 ¹ / ₄
2 ¹ / ₂	24 00	7 ¹ / ₈	7	100 00	15
3	30 00	8 ³ / ₄	8	130 00	15 ¹ / ₈
3 ¹ / ₂	35 00	9 ¹ / ₈	9	200 00	19 ¹ / ₈
4	40 00	10 ³ / ₄	10	200 00	19 ¹ / ₈
4 ¹ / ₂	45 00	11 ¹ / ₂	12	275 00	22
5	55 00	12 ¹ / ₄	14	345 00	21 ¹ / ₄

Sizes 2 to 4 inches, inclusive, made with screw ends; all larger have flange ends. Companion flanges are always extra and only furnished with valves when so ordered.

SEMI-BALANCED BACK PRESSURE VALVE.

DOUBLE SEATED.

Experience has taught us that our single seated type of Back Pressure Valve is preferable and generally the best adapted to conditions as usually found in modern steam heating practice; still, for very large sizes of valves, for special purposes or to meet peculiar conditions, it is sometimes found very



Figure 368.
Horizontal Pattern.

advisable to divide the area of valve seats up into two sections, to obviate the use of extreme large regulating weights, and to obtain greater sensitiveness and consequent closer regulation. By employing double seats and also double lever where necessary, friction is reduced to the finest point, making them very desirable for service in large modern equipped power plants.

We do not advocate the use of these valves in sizes smaller than 12 inches.

Size Inches.	Price Each.	Face to Face Flanges Inches.	Size Inches.	Price Each.	Face to Face Flanges Inches.
8	\$130.00	21 $\frac{1}{4}$ 21 $\frac{1}{4}$	16	\$ 465.00	23 $\frac{1}{4}$
9	200.00		18	600.00	25 $\frac{3}{4}$
10	200.00		20	750.00	28
12	275.00		22	900.00	
14	345.00		24	1050.00	

All sizes made with flange ends. Companion flanges are always extra and only furnished with valves when so ordered.
In ordering it is especially important that we have particulars of service upon which valve is to be used.

The Composite Semi-Balanced Back Pressure Valve.

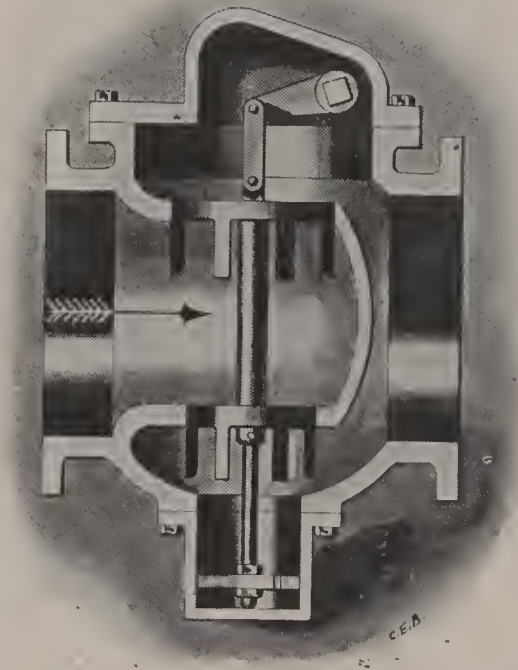


Figure 369.

The above Back Pressure Valve is the result of combining the good points of a number of valves, leaving out all the recognized bad points, thus combining more good qualities than have ever been combined in one valve heretofore.

The operation of this valve is exceedingly sensitive, and at the same time entirely noiseless. It is adapted to work on any pressure from atmosphere to 30 pounds.

This valve is intended and especially made to hold a Back Pressure, where, for instance, the exhaust steam is used for heating purposes, and must therefore not be confounded with our horizontal or vertical Atmospheric Relief Valves.

Prices same as on pages 251 and 252.

THE DAVIS NOISELESS BACK-PRESSURE VALVE.

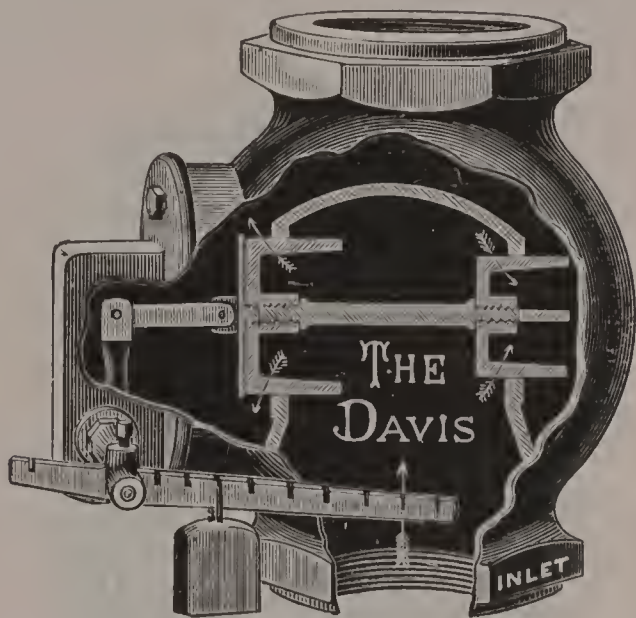


Figure 370.

Perfectly Noiseless in operation at Any Pressure.
Valves are not fitted tight unless so ordered.

PRICE LIST OF BACK PRESSURE VALVE.

Sizes, Inches....	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	16	18	20	22	24
Price, Each	\$ 14	\$ 16	\$ 18	\$ 22	\$ 25	\$ 30	\$ 40	\$ 60	\$ 80	\$100	\$120	\$145	\$220	\$345	\$465	\$600	\$750	\$900	\$1050
Length Screw End Valves In.	7½	7½	8¼	9	10	10¾	11½	13	14½	Valves from 3 to 7 inches inclusive made either flanged or screwed end. Larger sizes flanged end only.									
Length Flanged Valves, Inches..	Screw End Only.	8¼	4	10	10¾	11½	13	14¼	16½	18	19	21	23	26	29½	33	36	39	
Diameter of Flanges, Inches.		7½	8½	9	9¼	10	11	12½	13½	15	16	19	21	23½	25	27½	29½	32	

NO. 2 PRESSURE REGULATOR.

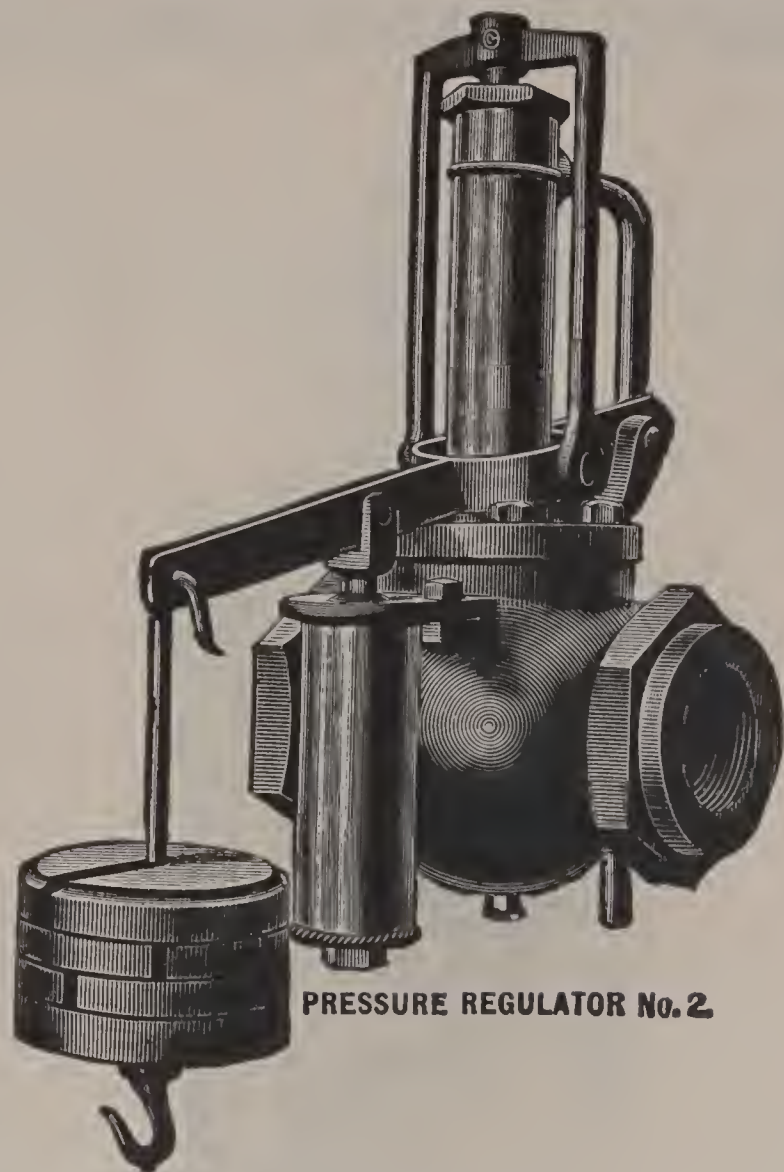


Figure 371.

FOR LARGE POWER PLANTS, ELECTRIC LIGHT STATIONS, ETC.

This style regulator is the same as No. 1 with the addition of oil-cylinder (dashpot) which will prevent jumping or chattering under all conditions and is to be used where there is a pulsation or vibration of pressure, such as would be found in the steam pipe of a pump or engine, caused by the opening and closing of the valves; in steam heating system, caused by exhaust from Engines, Pumps, Steam Elevators, etc.

On Steam Pumps it will maintain a uniform pressure of delivery, regardless of speed or volume, by being placed in the steam pipe.

And is the only Regulator in the market that will regulate successfully where a high delivery pressure is required. Note what engine builders and some of the largest power users in the country have to say of this valve.

In ordering please state purpose for which each valve is to be used.

PRICE LIST NO. 2 PRESSURE REGULATOR.

Size, Inches,..	¾	1	1¼	1½	2	2½	3	3½	4	5	6	7	8	10	12	15
Price, Each...	\$25	\$27	\$29	\$30	\$36	\$42	\$48	\$58	\$70	\$90	\$120	\$160	\$200	\$300	\$435	\$600
Length. Screw-End.. Valves, Inch.	3¾	4	5	7	7½	7½	9½	9½	10½	11½	12½					
Length Flanged..... Valves, Inch.					7½	7½	9½	9½	10½	11½	12½	13½	16	20	21	24½
Diameter of Flanges, Inches.....					6	7	7½	8½	9	10	11	12½	13½	16	19	22

¾ to 1½ inch, inclusive, Screw end; 2, 2½, 3, 4, 5, and 6-inch, either Flanged or Screw End. 7 to 15-inch Flanged End.

For VERY low pressure such as Vacuum System of Steam Heating, order Valve No. 3.

IMPROVED DAMPER REGULATOR.

SENSITIVE TO A ONE-HALF POUND VARIATION OF STEAM PRESSURE. ALMOST ABSOLUTE PERFECTION ATTAINED IN THIS LINE OF DEVICES.

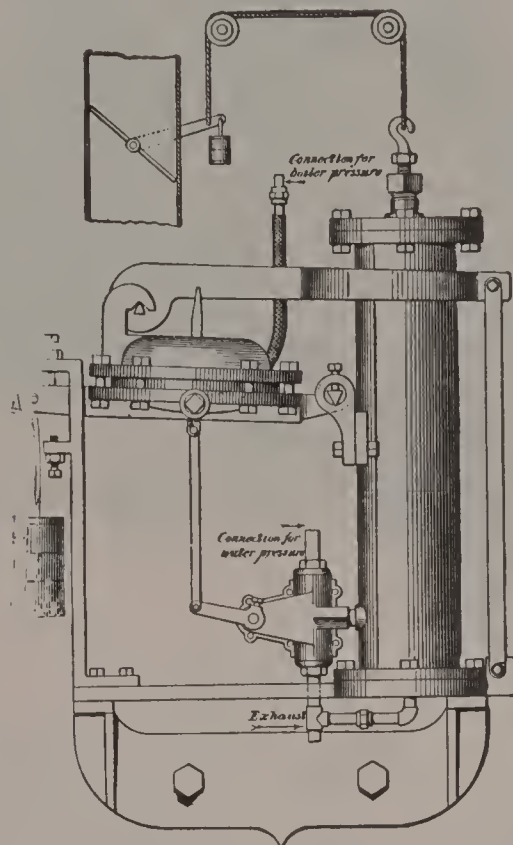


Figure 372.

For perfectly controlling movements of Dampers in connection with Boilers according to the rise and fall of steam pressures.

Will control one or more Dampers, either singly or in battery formation, the largest equally as well as the smallest, thereby obtaining and maintaining a constant uniform and unvariable steam pressure on Boilers followed by making it possible to effect a very large saving in fuel consumption, repairs to boilers and boiler furnaces and secure the many other desirable results which follow carrying a uniform steam pressure.

These Damper Regulators possess many unique and advanced features of construction which make them sensitive to a degree, positive and accurate in operation and economical in maintenance, the details of which we are unable to give here owing to lack of space. However, suffice it to say, that upon request from interested parties we will gladly send special circulars giving full particulars and furnish any and all information concerning them that may be desired. List price, each, \$150.00.

Multi-Tubular Oil and Grease Extractor.

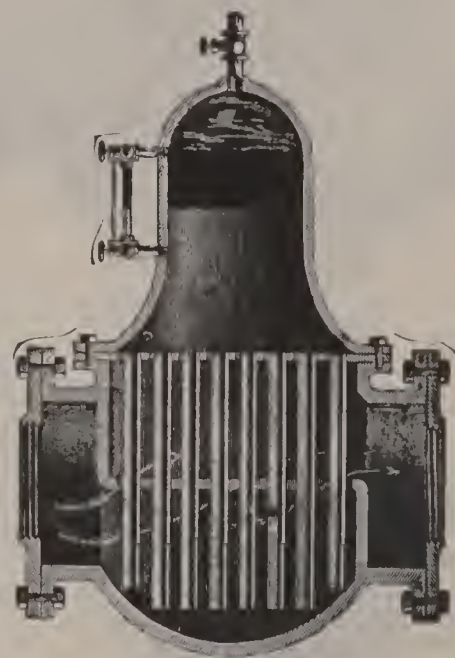


Figure 373.

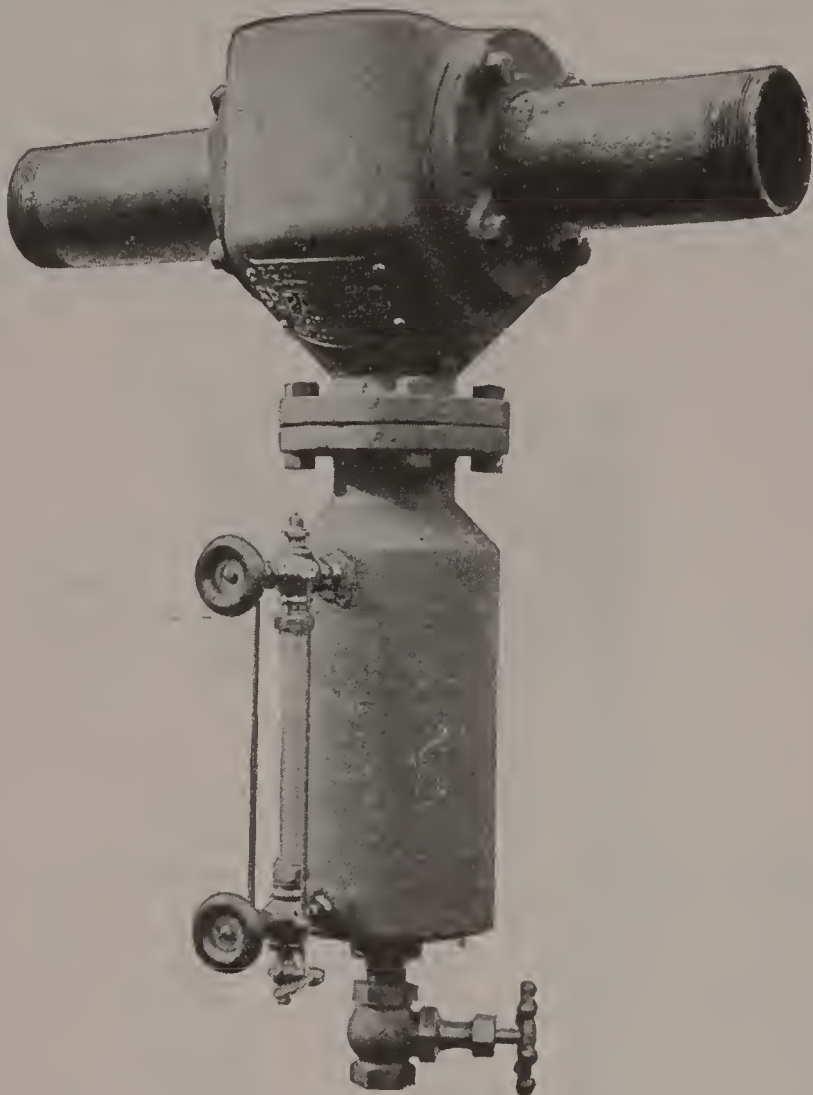
For service where Exhaust Steam is used for heating or other purposes. As is well known, the exhaust steam from engines, pumps, etc., carries with it a large amount of the oil used in lubricating, together with other impurities, and it is highly necessary that this oil, grease, dirt and other foreign matter be effectually removed before this Exhaust Steam can be safely used for heating or other purposes, to avoid the risk of having radiators and all connections coated with a heavy deposit of grease, oil or dirt, causing a loss of efficiency in heating surfaces and also the positive danger of this matter coming back into Boilers and resulting in burnt sheets and attending costly repairs. The Multi-Tubular Separator contains more effective baffling surface than any other separator on the market and a strong feature of them is that there is an absolute minimum of back pressure caused as each separator of a given size is sufficiently large to permit of a free and unobstructed flow of steam, free from all impurities.

PRICE LIST

Size, Inches.	Price, Each.	Face to Face Flanges, Inches,	Size, Inches.	Price, Each.	Face to Face Flanges, Inches.
2	\$30 00	7	6	\$104 00	14
2½	35 00	7¼	7	120 00	15
3	45 00	8¾	8	145 00	16¼
3½	55 00	9¼	9	165 00	19
4	64 00	10½	10	200 00	19
4½	75 00	11¾	12	250 00	22
5	83 00	12¼			

SEPARATORS.
COCHRANE HORIZONTAL SEPARATOR.

STANDARD
FORM
FOR
HORIZON-
TAL
PIPES.



OIL
SERVICE
OR,
LIVE
STEAM,
(125 lbs.
pressure or
under.)

Figure 374.



Figure 375.

“NEW CENTURY” IMPROVED
STEAM SEPARATOR.

Size Inches.	Price Each.	Face to Face Flanges Inches.	Size Inches.	Price Each.	Face to Face Flanges Inches.
2	\$30 00	11 ³ / ₄	6	\$104 00	18
2 ¹ / ₂	35 00	11 ³ / ₄	7	120 00	18
3	45 00	14 ¹ / ₄	8	145 00	21
3 ¹ / ₂	55 00	14 ¹ / ₄	9	165 00	23 ¹ / ₂
4	64 00	16 ³ / ₈	10	200 00	23 ¹ / ₂
4 ¹ / ₂	75 00	16 ³ / ₈	12	250 00	25
5	83 00	17 ¹ / ₂			

The importance of furnishing dry steam to engines, pumps, etc., cannot be over estimated.

The above Separators are very compactly built, giving economy of space with minimum weight and at the same time are so scientifically constructed and proportioned as to secure the highest attainable efficiency in separating and removing all the water which is found entrained with steam, intercepting same into a chamber which does not present an excessive amount of condensation surface. This together with the fact, that while the baffling surface is amply sufficient, it is so arranged as to preserve the velocity of steam passing through Separator without reduction of pressure.

A Steam Trap is absolutely necessary in connection with all Steam Separators to obtain best service.

“TOMPKINS” EXPANSION STEAM TRAP.



Figure 376.

We make this Steam Trap in our shops. It will discharge the water out of pipes and not lose any steam.

PRICES.

No. 1.	1/2-inch Tube 30 inches long will Drain	3,000 feet 1-inch Pipe .	\$ 8 00
No. 2.	1/2-inch Tube 34 inches long will Drain	5,000 feet 1-inch Pipe .	10 00
No. 3.	3/4-inch Tube 38 inches long will Drain	8,000 feet 1-inch Pipe .	15 00
No. 4.	1 -inch Tube 40 inches long will Drain	10,000 feet 1-inch Pipe .	18 00
No. 5.	1 1/4-inch Tube 44 inches long will Drain	15,000 feet 1-inch Pipe .	24 00

OIL FILTERS.



Figure 377.

Every user of lubricating oil appreciates the fact that the larger portion of all the oil he buys is not consumed by the machinery on which it is used, but passes through, and, but for the fact that it becomes filled with dirt and grit, could be used again. This waste frequently amounts to from 50 to 75 per cent of the oil used. The lubricating properties are not affected in the least, and if the impurities can be eliminated, the oil can be used over and over again with perfect safety. With an Oil Filter at hand, oil may be used over and over again. There is no waste, and every dollar's worth of oil is used up. When it is remembered that this means a saving of from 50 to 75 per cent, and often more, in the expenditure for lubricating oil, it is obvious that a Filter is an investment which pays large dividends. It is, in fact, a necessity to every user of oil who has an eye to economy and cannot feel justified in throwing money away.

PRICES.

“Regular” No. 1, Filters	15 to 20 gallons per day		\$ 25 00*
“Regular” No. 2, Filters	3 to 5 gallons per day		15 00*
“Special” No. 3, Filters	30 to 40 gallons per day		60 00
“Special” No. 4, Filters	50 to 60 gallons per day		75 00
“Special” No. 5, Filters	70 to 90 gallons per day		90 00
“Special” No. 6, Filters	100 to 120 gallons per day		120 00
“Special” No. 7, Filters	120 to 150 gallons per day		140 00
“Special” No. 8, Filters	150 to 200 gallons per day		200 00
“Special” No. 9, Filters	200 to 250 gallons per day		250 00
“Special” No. 10, Filters	250 to 300 gallons per day		300 00
“Special” No. 11, Filters	300 to 400 gallons per day		400 00
“Special” No. 12, Filters	400 to 500 gallons per day		500 00

*All “Special Filters” have extra heavy brass fittings, water gauge and cover. If desired, we can furnish water gauge and cover on the No. 1 or No. 2 Filter at \$4.50 additional.

EXHAUST HEAD.

SEPARATES WATER AND OIL FROM EXHAUST STEAM.

NO SPRAY.
NO ROTTING ROOFS.
NO EXPENSIVE REPAIRS.



BUILT IN SIZES TO
FIT 1 INCH TO 60
INCH PIPE.

Prices Given on Application.

Figure 378.

PRESSURE OR VACUUM GAUGE.

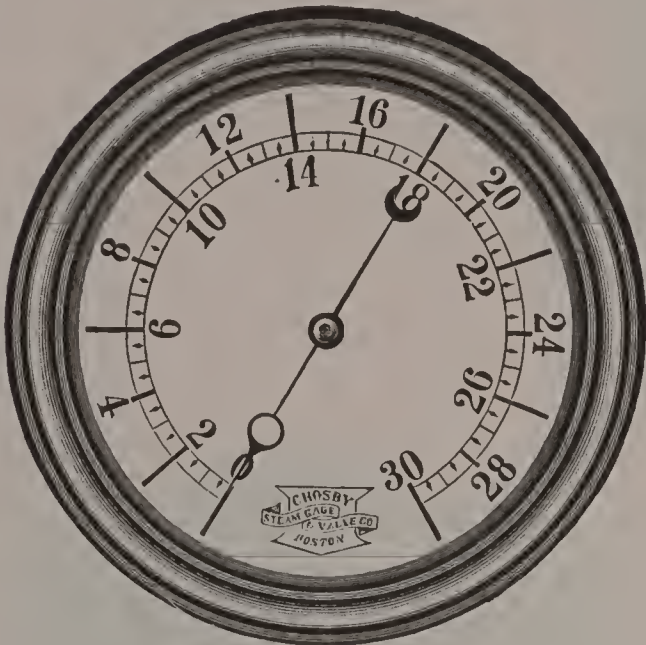


Figure 379.

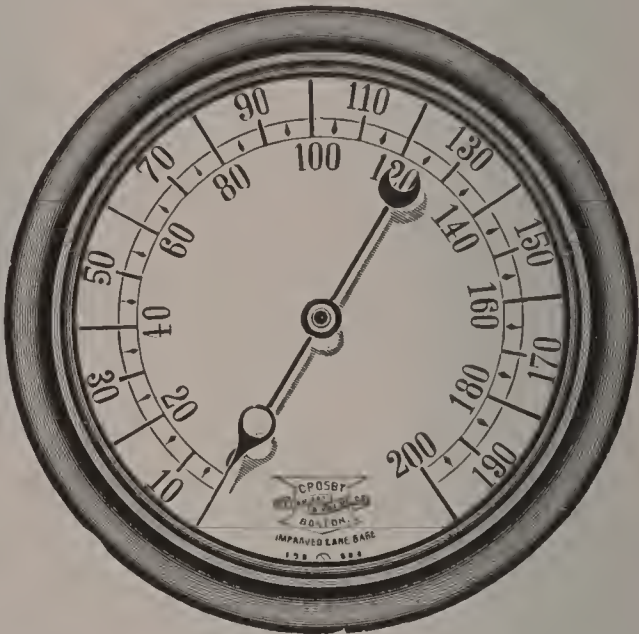


Figure 380.

PRICES, INCLUDING COCK.

SIZE.	Iron Case Brass Ring	Iron Case, N. P. Ring.	Brass Case	N. P. Case.	Brass Deep Case O. G. or Oct. Ring.	N. P. Deep Case, O. G. or Oct. Ring.
16 inch Dial,	\$90 00	\$92 50	\$125 00	\$135 00		
12 "	50 00	51 50	75 00	79 00	\$80 00	\$84 00
10 "	32 00	33 00	40 00	43 00	44 00	47 00
8 1/2 "	22 00	22 75	30 00	32 50	33 50	36 00
6 3/4 "	16 00	16 60	20 00	22 00	23 00	25 00
6 "	13 00	13 50	16 00	17 50	18 50	20 00
5 1/2 "	10 00	10 25	12 00	13 25	13 75	15 00
5 "	8 00	8 20	11 00	12 00	12 50	13 50
4 1/2 "	8 00	8 20	10 00	11 00	11 50	12 50
3 1/2 "	7 00	7 18	9 00	9 75	10 25	11 00
3 or 2 1/2			8 00	8 60	9 25	9 75

All gauges of whatever kind are graduated and tested by the most improved instruments and methods, and are warranted correct.

No steam gauge should be used without a siphon of sufficient capacity to fill the gauge tube with water and keep it cool.

HYDRAULIC OR HYDROSTATIC GAUGE.

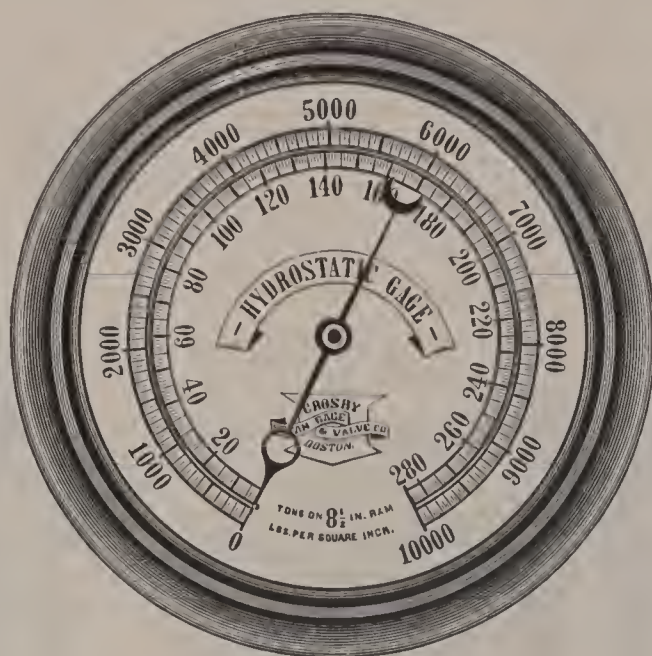


Figure 381.

For indicating pressures above 1,000 pounds and up to 25,000 pounds per square inch. It is warranted to register correctly any pressure marked on the dial. This gauge has a check valve integral with the gauge socket or shank for preserving it from the severe shocks attending the sudden introduction or release of the pressure to which it may be subjected.

For a gauge not provided with its own check valve, we furnish a special check valve which will preserve it from severe shocks as described above.

In ordering always give highest pressure to be carried, either in pounds per square inch or in tons, and also state diameter of piston of ram.

PRICES.

SIZE.	Iron Case, Brass Ring.	Iron Case, N. P. Ring.	Brass Case.	N. P. Case.
12 inch Dial.....	\$110.00	\$111.50	\$125.00	\$129.00
10 "	90.00	91.00	100.00	103.00
8½ "	70.00	70.75	80.00	82.50
6¾ "	50.00	50.60	60.00	62.00
6 "	35.00	35.50	40.00	41.50
5½ "	30.00	30.25	35.00	36.25
*4½ " ..	25.00	25.20	30.00	31.00

*Limit of pressure, 3,000 pounds.

Maximum hand, \$5.00 each. Hydraulic Check Valve, \$8.00.

Hydraulic Needle valve, \$10.00.

Dials graduated to show the corresponding aggregate pressure in tons on area of ram without extra charge. These gauges are made with steel tubes for all pressure above 1,000 pounds per square inch and graduated to the most approved standard of hydrostatic pressure.

POP SAFETY VALVE.



Figure 382.

Portable and Farm Engine Style.

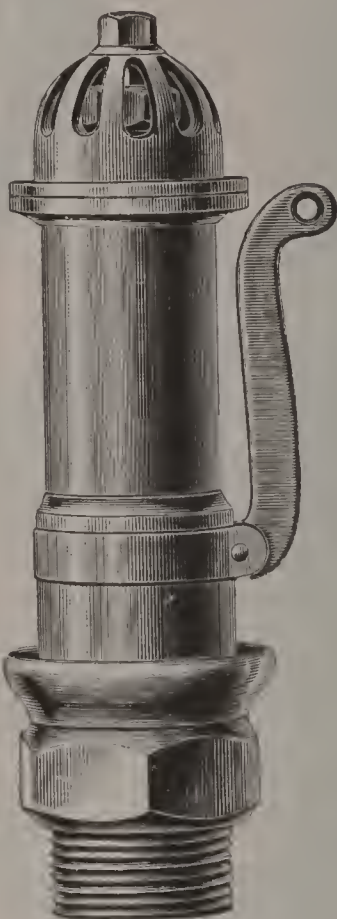


Figure 383.

With Lock-up or Perforated Cap.

PRICES.

	Plain.	Perforated Caps.
1/2-inch, for boilers below 3 H. P.	\$ 8 00	\$ 9 75
3/4-inch, for boilers from 3 to 5 H. P.	10 00	12 00
1 -inch, for boilers from 5 to 10 H. P.	12 00	14 25
1 1/4-inch, for boilers from 10 to 20 H. P.	15 00	17 50
1 1/2-inch, for boilers from 20 to 30 H. P.	20 00	22 75
2 -inch, for boilers from 30 to 40 H. P.	30 00	33 00

In ordering, state pressure to be carried.

POP SAFETY VALVE.
FOR STATIONARY AND MARINE BOILERS.
PATENTED.

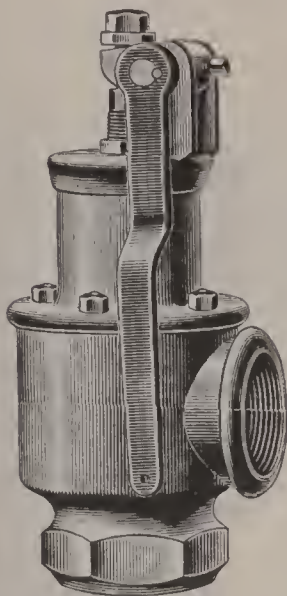


Figure 384.
Screwed Base.

One of the advantages which this design of safety valve has is the convenience which it affords for the removal of its top to inspect or repair it when it is attached to the boiler for use, without detaching the outlet pipe.

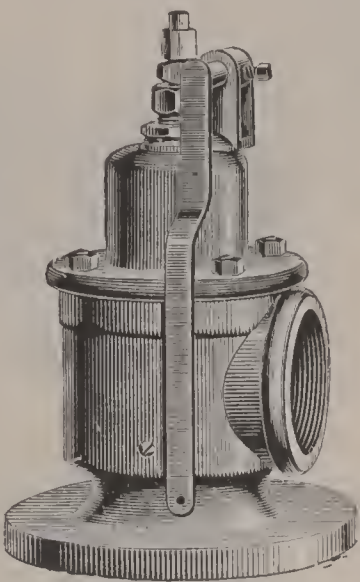


Figure 385.
Flanged Base.

PRICES.

Size,	Style of Base.	Diameter of side Outlet Screwed.	Height of Valves.	Capacity Horse Power.	REGULAR.		NICKEL-SEATED.	
					Plain.	Lock-up.	Plain.	Lock-up.
2 in.	Screwed.....	2 inches.	12¼ in.	25 to 40	\$30	\$35	\$38	\$43
2½ "	Screwed or 9 in flg.	2½ "	13 "	40 to 75	50	55	60	65
3 "	" 9 "	3 "	14 "	75 to 100	65	75	77	87
3½ "	" 10 "	3½ "	16½ "	100 to 125	80	90	94	104
4 "	" 11 "	4 "	18½ "	125 to 150	100	110	116	126
4½ "	" 11 "	9½ in. flg.	22½ "	150 to 175	125	135	145	155
5 "	" 12 "	9½ "	25½ "	175 to 200	160	170	185	195
5½ "	" 12 "	10 "	25½ "	200 and	220	235	260	285
6 "	" 14 "	10 "	27 "	upwards.	250	270	290	310

In ordering, state pressure to be carried. If flange is desired, state diameter.

STEAM GAUGE SYPHONS.
BRASS AND IRON.

These siphons are durable and cheap and no steam gauge should be connected without one between it and the boiler.

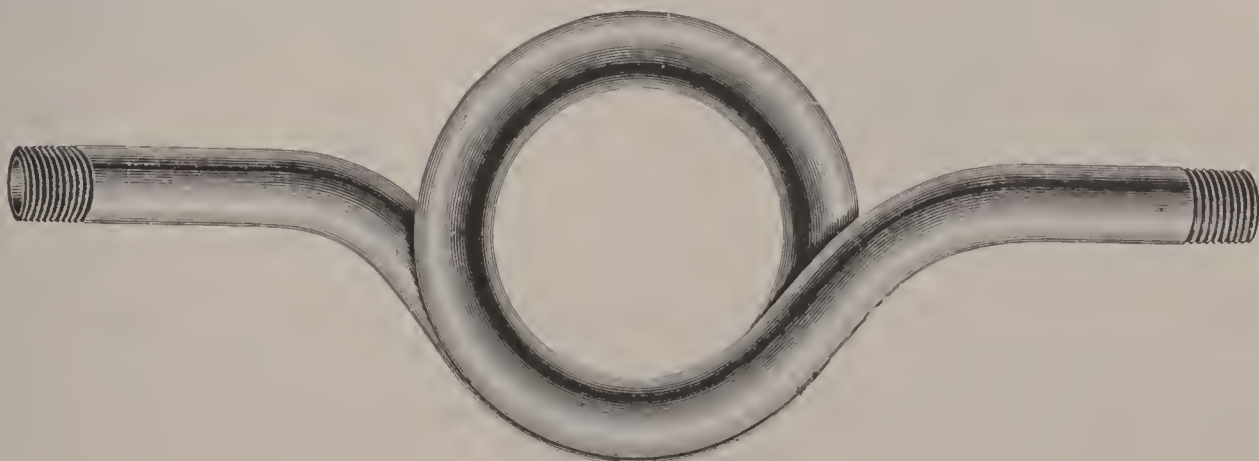


Figure 386.

PRICE LIST

Size Pipe Thread	¼ inch
Iron	Each, \$ 50
Brass, Finished	Each, 1 80
Brass, Nickel Plated	Each, 2 00

SINGLE BELL CHIME WHISTLES.



Figure 387.
All Brass with Adjustable
Lever.

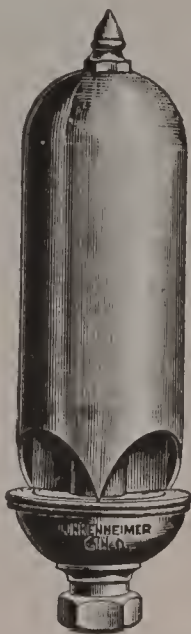


Figure 388.
All Brass without
Valve.



Figure 389.
Locomotive Style with
Upright Valve.

The Single Bell Chime Whistles shown above differ essentially from other makes, inasmuch as the bells are cast in one piece instead of being made in several parts. Owing to this method of construction these whistles (when blown) give clear, bell-like, musical sounds, which are much more pleasing to the ear than those produced by common whistles.

The appearance of whistles is unique and handsome, they are well made, perfectly tuned, and for durability of construction are unequaled.

PRICE LIST.

Diameter of Bells, inches	1½	2	2½	3	3½	4	5	6	8	10
Size of Pipe Connection, } inches }	¾	1½	¾	¾	1	1¼	1½	1½	2	2½
All Brass with Adjust- } able Lever, . . . each }	7 00	10 00	13 00	16 00	22 00	28 00	44 00	60 00	145 00	235 00
All Brass without Valve, } each }	5 50	8 50	10 50	13 50	18 50	24 00	37 00	49 00	120 00	188 00
Iron Base without Valve, } each }	....	.....	.....	12 00	16 50	22 00	33 00	45 00	108 00	155 00
All Brass Locomotive } Style. each }	....	....	.....	.....	.....	27 50	43 00	59 00	.....	.....

PATENT ADJUSTABLE JAW VISES.

MACHINISTS' VISE.

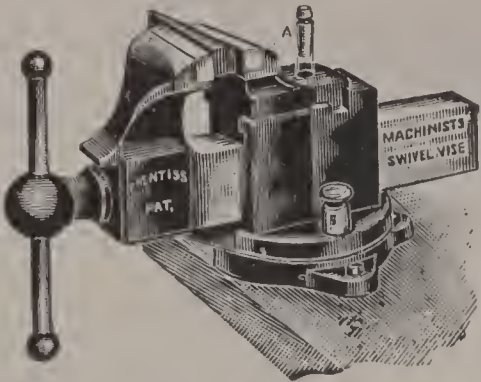
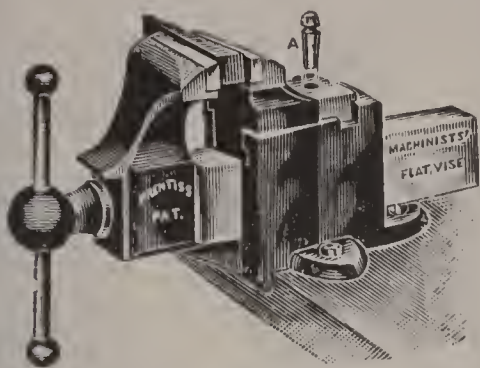


Figure 390.

Machinists' Stationary Bottom Vises.

Figure 391.

Machinists' Patent Swivel Bottom Vises.

The back jaw of this vise is adjustable, and in use conforms by automatic action to any angle, adjusts itself, and makes firm the object held, whether it be straight, beveled or wedge-shaped. By inserting pin A the jaw becomes fixed, thus making a parallel solid jaw vise.

Width of Jaws.	Jaws Open.	Weight, Flat Base.	Weight, Swivel Base.	Flat Base, Each.	Swivel Base, Each.
2⅝ inches	3½ inches	13½ lbs.	17 lbs.	\$ 5 50	\$ 6 75
3½ "	4¾ "	28 "	32 "	7 00	8 50
4 "	5¼ "	41 "		9 00	10 50
4½ "	6 "	54 "	65 "	10 50	12 50
5¼ "	8 "	96 "	109 "	17 00	19 00
6 "	9 "	146 "	168 "	24 00	27 00
7 "	11 "	184 "	207 "	30 00	35 00

MACHINISTS' "BULL DOG" VISES.

MACHINISTS' SOLID JAW PARALLEL VISE.

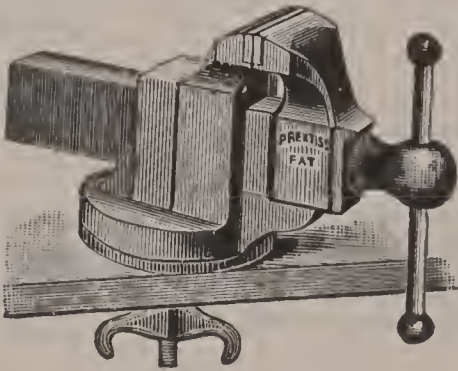
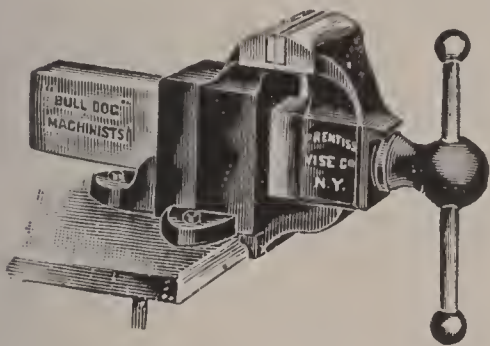


Figure 392.

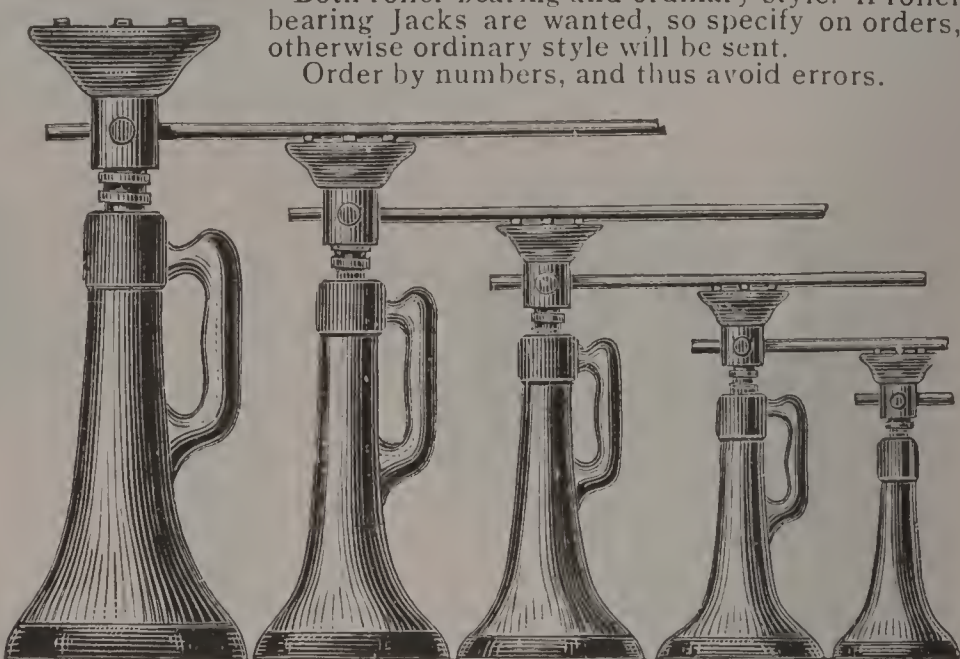
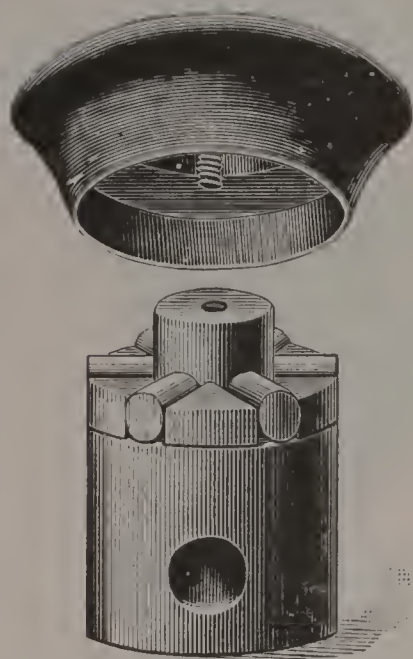
Machinists' Stationary Bottom Vise.

Figure 393.

Machinists' Swivel Bottom Vise.

STATIONARY BOTTOM.				SWIVEL BOTTOM.			
Width Jaw.	Opens.	Weight.	List Price.	Width Jaw.	Opens.	Weight.	List Price.
3¼ inches	4 inches	22 lbs.	\$ 6 00	3¼ inches	4 inches	28 lbs.	\$ 7 50
3⅝ "	5 "	28 "	7 00	3⅝ "	5 "	36 "	8 75
4⅛ "	5½ "	42 "	8 50	4⅛ "	5½ "	52 "	10 50
4⅝ "	6¼ "	52 "	10 00	4⅝ "	6¼ "	64 "	12 50
5 "	7 "	72 "	13 00	5 "	7 "	85 "	16 00
5½ "	8½ "	100 "	18 50	5½ "	8½ "	115 "	22 00
6 "	9½ "	135 "	25 00	6 "	9½ "	155 "	30 00

JACK SCREWS.



Both roller bearing and ordinary style. If roller bearing Jacks are wanted, so specify on orders, otherwise ordinary style will be sent.
Order by numbers, and thus avoid errors.

Figure 394.

Ball-bearing Jacks are very satisfactory when not heavily loaded, but in order to gain greater efficiency, rollers, instead of balls, are now used for bearings as shown in cut. These rollers will stand any load that the Jack will carry, and are not liable to get out of order. These Roller Jacks have been thoroughly tested with a spring balance and show a saving of 75 per cent of power needed to lift a given weight.

The price is about ten per cent. more for Roller Jacks, and the gain is 75 per cent. This ought to insure their sale as fast as the facts become known.

Diameter of Screw.		Height of Barrel.	Height of Jack when turned down to the lowest point.	Net Rise.	Whole Height.	Weight.	Estimated Lifting Capacity.		Price.
No.							No.		
1,	1 1/4 in.	6 in.	8 in.	4 in.	12 in.	10 lbs.	No. 1,	10 tons.	\$2 50
"	2, 1 1/4 in.	7 in.	10 in.	6 in.	16 in.	11 1/2 lbs.	" 2,	10 "	3 00
"	3, 1 1/2 in.	7 1/2 in.	10 in.	5 in.	15 in.	18 1/2 lbs.	" 3,	12 "	3 25
"	4, 1 1/2 in.	9 in.	12 in.	7 in.	19 in.	18 lbs.	" 4,	12 "	3 75
"	5, 1 1/2 in.	10 1/2 in.	14 in.	9 in.	23 in.	25 lbs.	" 5,	12 "	4 00
"	6, 1 3/4 in.	9 in.	12 in.	6 in.	18 in.	24 lbs.	" 6,	16 "	4 25
"	7, 1 3/4 in.	10 1/2 in.	14 in.	8 in.	22 in.	28 3/4 lbs.	" 7,	16 "	4 50
"	8, 1 3/4 in.	12 1/2 in.	16 in.	10 in.	26 in.	33 1/2 lbs.	" 8,	16 "	5 00
"	9, 1 3/4 in.	15 in.	18 in.	12 in.	30 in.	37 1/2 lbs.	" 9,	16 "	5 50
"	10, 2 in.	8 1/2 in.	12 in.	5 in.	17 in.	31 lbs.	" 10,	20 "	5 50
"	11, 2 in.	10 1/2 in.	14 in.	7 in.	21 in.	36 lbs.	" 11,	20 "	6 00
"	12, 2 in.	12 in.	16 in.	9 in.	25 in.	41 1/2 lbs.	" 12,	20 "	7 00
"	13, 2 in.	16 in.	20 in.	13 in.	33 in.	50 lbs.	" 13,	20 "	8 00
"	14, 2 1/2 in.	10 in.	14 in.	8 in.	22 in.	48 lbs.	" 14,	28 "	8 50
"	15, 2 1/2 in.	12 in.	16 in.	10 in.	26 in.	53 1/4 lbs.	" 15,	28 "	9 50
"	16, 2 1/2 in.	15 1/2 in.	20 in.	14 in.	34 in.	69 lbs.	" 16,	28 "	11 00
"	17, 2 1/2 in.	20 in.	24 in.	18 in.	42 in.	85 lbs.	" 17,	28 "	13 00

CAR JACKS.

Diameter of Screw.		Height of Barrel.	Height of Jack when turned down to the lowest point.	Net Rise.	Whole Height.	Weight.	Estimated Lifting Capacity.		Price.
No.							No.		
No. 17 1/2,	2 in.	6 in.	10 in.	4 in.	14 in.	20 lbs.	No. 17 1/2,	20 tons.	\$5 00
" 18,	2 in.	8 1/2 in.	12 in.	5 in.	17 in.	31 lbs.	" 18,	20 "	5 50
" 19,	2 in.	10 1/2 in.	14 in.	7 in.	21 in.	36 lbs.	" 19,	20 "	6 00
" 20,	2 in.	12 in.	16 in.	9 in.	25 in.	41 lbs.	" 20,	20 "	7 00

These Jacks have cast iron barrels, with steel screws cut in a lathe.



Figure 395.

A Corner of our Supply Room.

Send us your orders for
PIPE,
PIPE FITTINGS,
VALVES,
STEAM SPECIALTIES,
Etc., Etc.

Pipe from $\frac{1}{8}$ " to 20." Cut to length on short notice.

Castings and repair work of every description.

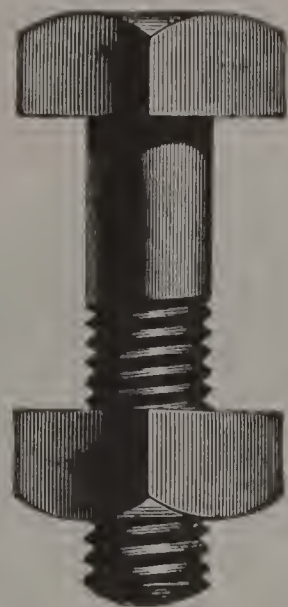


Figure 396.

MANUFACTURERS' STANDARD LIST.

MACHINE AND
CAR BOLTS.

Square Heads and Nuts.

Finished Points and Fitted with Cold-Punched Nuts.

With Square Heads.

PRICE PER HUNDRED.



Figure 397.

LENGTH under Head.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$ & $\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$ *	$1\frac{1}{4}$ *
1½ ins.	1.70	2.00	2.40	2.80	3.60	5.20	7.20	10.50	. .	. .	. .
2 "	1.78	2.12	2.56	3.00	3.86	5.58	7.70	11.20	16.00	. .	. .
2½ "	1.86	2.24	2.72	3.20	4.12	5.96	8.20	11.90	16.90	24.90	. .
3 "	1.94	2.36	2.88	3.40	4.38	6.34	8.70	12.60	17.80	26.10	34.50
3½ "	2.02	2.48	3.04	3.60	4.64	6.72	9.20	13.30	18.70	27.30	36.00
4 "	2.10	2.60	3.20	3.80	4.90	7.10	9.70	14.00	19.60	28.50	37.50
4½ "	2.18	2.72	3.36	4.00	5.16	7.48	10.20	14.70	20.50	29.70	39.00
5 "	2.26	2.84	3.52	4.20	5.42	7.86	10.70	15.40	21.40	30.90	40.50
5½ "	2.34	2.96	3.68	4.40	5.68	8.24	11.20	16.10	22.30	32.10	42.00
6 "	2.42	3.08	3.84	4.60	5.94	8.62	11.70	16.80	23.20	33.30	43.50
6½ "	2.50	3.20	4.00	4.80	6.20	9.00	12.20	17.50	24.10	34.50	45.00
7 "	2.58	3.32	4.16	5.00	6.46	9.38	12.70	18.20	25.00	35.70	46.50
7½ "	2.66	3.44	4.32	5.20	6.72	9.76	13.20	18.90	25.90	36.90	48.00
8 "	2.74	3.56	4.48	5.40	6.98	10.14	13.70	19.60	26.80	38.10	49.50
9 "	2.90	3.80	4.80	5.80	7.50	10.90	14.70	21.00	28.60	40.50	52.50
10 "	3.06	4.04	5.12	6.20	8.02	11.66	15.70	22.40	30.40	42.90	55.50
11 "	3.22	4.28	5.44	6.60	8.54	12.42	16.70	23.80	32.20	45.30	58.50
12 "	3.38	4.52	5.76	7.00	9.06	13.18	17.70	25.20	34.00	47.70	61.50
13 "	. .	. .	6.08	7.40	9.58	13.94	18.70	26.60	35.80	50.10	64.50
14 "	. .	. .	6.40	7.80	10.10	14.70	19.70	28.00	37.60	52.50	67.50
15 "	. .	. .	6.72	8.20	10.62	15.46	20.70	29.40	39.40	54.90	70.50
16 "	. .	. .	7.04	8.60	11.14	16.22	21.70	30.80	41.20	57.30	73.50
17 "	. .	. .	. .	. .	11.66	16.98	22.70	32.20	43.00	59.70	76.50
18 "	. .	. .	. .	. .	12.18	17.74	23.70	33.60	44.80	62.10	79.50
19 "	. .	. .	. .	. .	12.70	18.50	24.70	35.00	46.60	64.50	82.50
20 "	. .	. .	. .	. .	13.22	19.26	25.70	36.40	48.40	66.90	85.50
21 "	. .	. .	. .	. .	. .	20.02	26.70	37.80	50.20	69.30	88.50
22 "	. .	. .	. .	. .	. .	20.78	27.70	39.20	52.00	71.70	91.50
23 "	. .	. .	. .	. .	. .	21.54	28.70	40.60	53.80	74.10	94.50
24 "	. .	. .	. .	. .	. .	22.30	29.70	42.00	55.60	76.50	97.50

*The list prices for these sizes apply only to 100 lots.
Bolts furnished with Chamfered and Trimmed Nuts, unless otherwise specified.
Lists for ¾-inch and larger sizes up to 30 inches long in proportion when sufficient quantities are ordered. ⅜-inch Bolts charged at discretion.
With Hexagon Heads or Hexagon Nuts, 10 per cent extra.
With both Hexagon Heads and Nuts, 20 per cent extra.

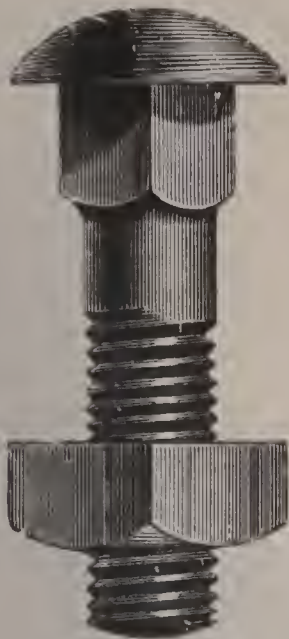


Figure 398.

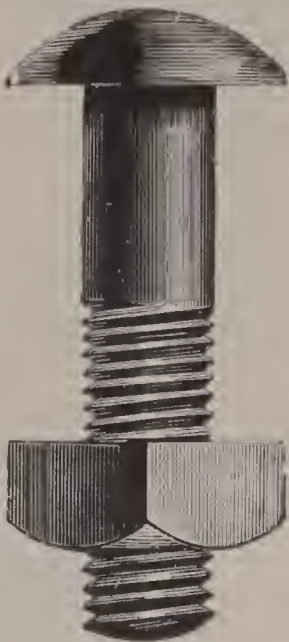


Figure 399.

BOLTS.

With Button Heads.

Square or Round Under the Head.

Finished Points and Fitted with Chamfered Nuts.

Price Per Hundred.

N. B—The length of the square under the head is limited to the scant diameter of the Bolt; with longer squares at advanced rates.

Length under Head.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$ & $\frac{5}{8}$	$\frac{3}{4}$
$1\frac{1}{2}$ inches.	1.70	2.00	2.40	2.80	3.60	5.20	7.20
2 "	1.78	2.12	2.56	3.00	3.86	5.58	7.70
$2\frac{1}{2}$ "	1.86	2.24	2.72	3.20	4.12	5.96	8.20
3 "	1.94	2.36	2.88	3.40	4.38	6.34	8.70
$3\frac{1}{2}$ "	2.02	2.48	3.04	3.60	4.64	6.72	9.20
4 "	2.10	2.60	3.20	3.80	4.90	7.10	9.70
$4\frac{1}{2}$ "	2.18	2.72	3.36	4.00	5.16	7.48	10.20
5 "	2.26	2.84	3.52	4.20	5.42	7.86	10.70
$5\frac{1}{2}$ "	2.34	2.96	3.68	4.40	5.68	8.24	11.20
6 "	2.42	3.08	3.84	4.60	5.94	8.62	11.70
$6\frac{1}{2}$ "	2.50	3.20	4.00	4.80	6.20	9.00	12.20
7 "	2.58	3.32	4.16	5.00	6.46	9.38	12.70
$7\frac{1}{2}$ "	2.66	3.44	4.32	5.20	6.72	9.76	13.20
8 "	2.74	3.56	4.48	5.40	6.98	10.14	13.70
9 "	. . .	. . .	4.80	5.80	7.50	10.90	14.70
10 "	. . .		5.12	6.20	8.02	11.66	15.70
11 "	. . .		5.44	6.60	8.54	12.42	16.70
12 "	. . .	. . .	5.76	7.00	9.06	13.18	17.70
13 "	. . .	. . .	. . .	. . .	9.58	13.94	18.70
14 "	. . .	. . .	. . .	. . .	10.10	14.70	19.70
15 "	. . .	. . .	. . .	. . .	10.62	15.46	20.70
16 "	. . .	. . .	. . .	. . .	11.14	16.22	21.70
17 "	. . .	. . .	. . .	. . .	11.66	16.98	22.70
18 "	. . .	. . .	. . .	. . .	12.18	17.74	23.70
19 "	. . .	. . .	. . .	. . .	12.70	18.50	24.70
20 "	. . .	. . .	. . .	. . .	13.22	19.26	25.70

Button-Head Bolts will be sent with square under head, unless otherwise specified.

Larger sizes special. $\frac{3}{16}$ -inch Bolts charged at discretion.
With Hexagon Nuts, 10 per cent extra.

HANGER BOLTS.

One end cut with deep wood screw thread, the other end fitted with chamfered nuts.

FINISHED POINTS.

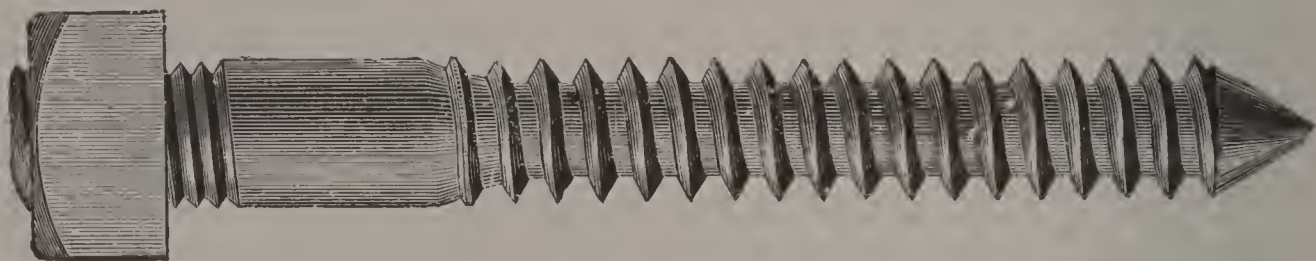


Figure 400.

PRICE PER HUNDRED.

(In 100 lots.)

Length over all.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
3 inch.	5.00	5.75	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
4 "	5.50	6.50	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
5 "	. . .	7.50	9 50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
6 "	. . .	8.00	10.50	13.00	16.00	. . .	. . .	. . .	. . .	. . .
7 "	. . .	8.50	11.25	14.50	18.00	25.00	. . .	. . .	. . .	. . .
8 "	. . .	9.00	12 00	15.50	19.50	27.00	36.00	. . .	. . .	. . .
9 "	. . .	. . .	12.75	16.50	21.00	28.50	38.00	52.00	. . .	. . .
10 "	. . .	. . .	13.50	17.50	22.00	30.00	41.00	56 00	70.00	80.00
11 "	. . .	. . .	. . .	18.25	23.00	31.50	43.00	59.50	74.00	85.00
12 "	. . .	. . .	. . .	19.00	24.00	33.00	45 00	63.00	78.00	90.00
14 "	. . .	. . .	. . .	20.50	26 00	35.50	48.50	69.00	86.00	100.00
16 "	. . .	. . .	. . .	22.00	28.00	38.00	52.00	75.00	94.00	110.00
18 "	. . .	. . .	. . .	. . .	. . .	40.50	55.50	81.00	102.00	120 00

In limited numbers, at discretion.

With Hexagon Nuts, 10 per cent extra.

MANUFACTURERS' STANDARD LIST.

WOOD OR LAG SCREWS.

WITH CONICAL POINT.

CUT WITH DEEP THREADS.

SQUARE HEADS.

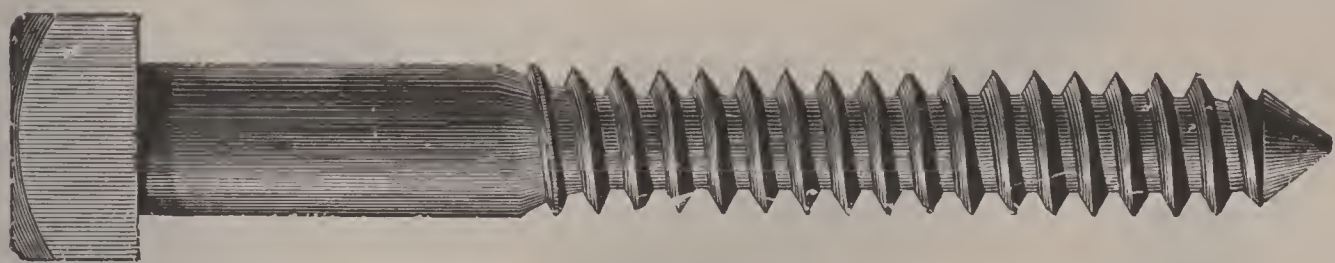


Figure 401.

PRICE PER HUNDRED.

Length under Head	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$ & $\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
1 ½ inches.	\$2.25	\$2.70	\$3.15	\$3.75				
2 "	2.45	2.96	3.47	4.11	\$5.00			
2½ "	2.65	3.22	3.79	4.47	5.50	\$7.90		
3 "	2.85	3.48	4.11	4.83	6.00	8.60	\$12.50	
3½ "	3.05	3.74	4.43	5.19	6.50	9.30	13.50	\$18.20
4 "	3.25	4.00	4.75	5.55	7.00	10.00	14.50	19.50
4½ "	3.45	4.26	5.07	5.91	7.50	10.70	15.50	20.80
5 "	3.65	4.52	5.39	6.27	8.00	11.40	16.50	22.10
5½ "	3.88	4.78	5.71	6.63	8.50	12.10	17.50	23.40
6 "	4.05	5.04	6.03	6.99	9.00	12.80	18.50	24.70
6½ "	. . .	. . .	6.35	7.35	9.50	13.50	19.50	26.00
7 "	. . .	. . .	6.67	7.71	10.00	14.20	20.50	27.30
7½ "	. . .	. . .	6.99	8.07	10.50	14.90	21.50	28.60
8 "	. . .	. . .	7.31	8.43	11.00	15.60	22.50	29.90
9 "	. . .	. . .	7.95	9.15	12.00	17.00	24.50	32.50
10 "	. . .	. . .	. . .	9.87	13.00	18.40	26.50	35.10
11 "	. . .	. . .	. . .	10.59	14.00	19.80	28.50	37.70
12 "	. . .	. . .	. . .	11.31	15.00	21.20	30.50	40.30
Add per inch or fraction.	.45	.55	.70	.80	1.15	1.60	2.10	2.70

Wood Screws with Cone Points will be sent unless Gimlet Points are specified.

With Hexagon Heads, 10 per cent extra in 100 lots; smaller lots at discretion.

Wood Screw Ends made to order.

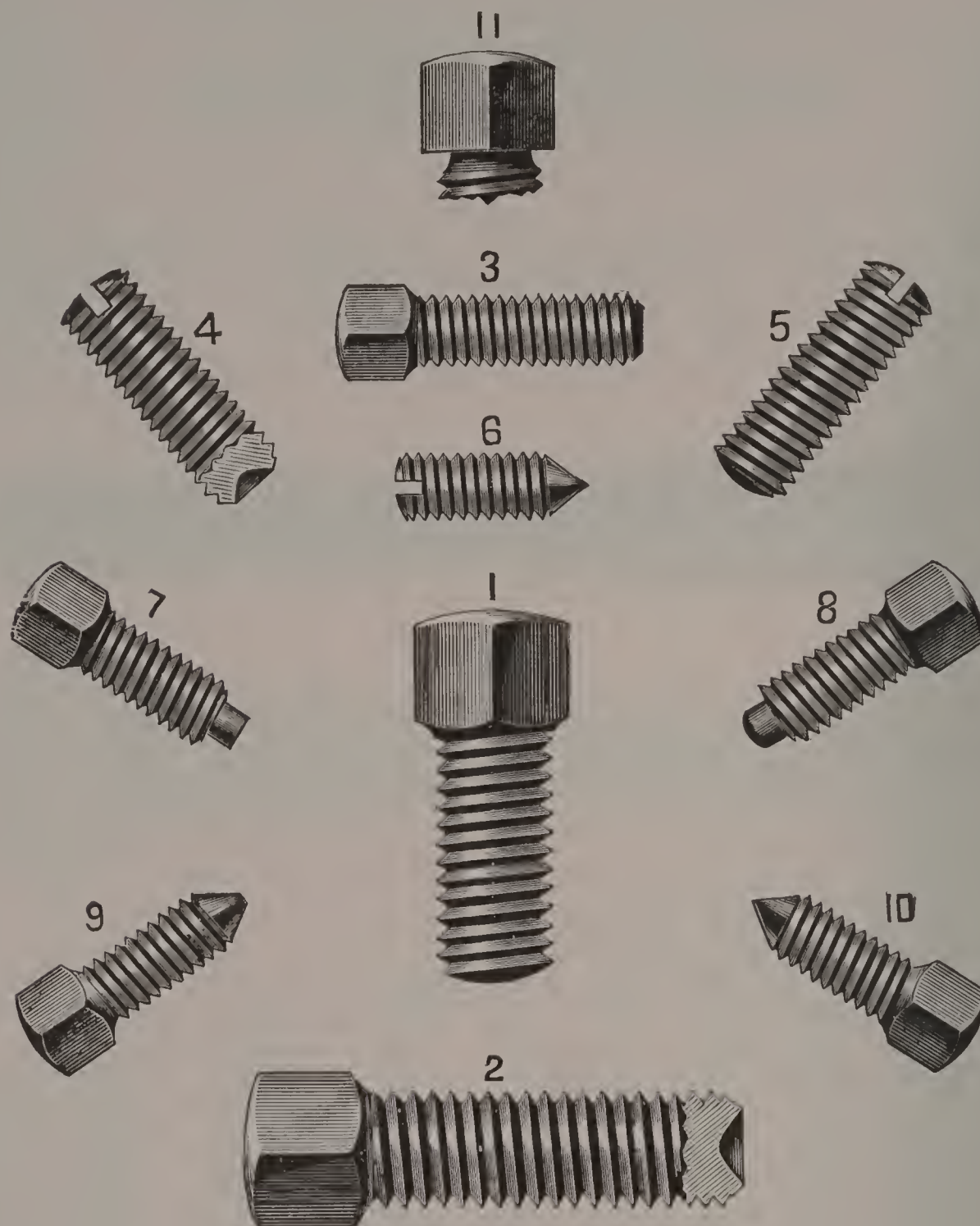


Figure 402.

- | | |
|----------------------------------|----------------------------|
| No. 1. Regular Round Point, Set. | No. 7. Flat, Pivot Point. |
| No. 2. Cup Point, Set. | No. 8. Round, Pivot Point. |
| No. 3. Flat Point, Set. | No. 9. Hanger, Set Point. |
| No. 4. Cup Point, Headless. | No. 10. Cone Point. |
| No. 5. Round Point, Headless. | No. 11. Necked Style. |
| No. 6. Cone Point, Headless. | |

In filling orders, style No. 1 is always forwarded, unless other kinds are specified.

Oval and Cup Point Set Screws are regular, all other kinds are special, and when ordered in lots of less than 500 of one diameter and length, will be charged at 10 per cent less discount.

Set Screw prices apply to Headless Set Screws, threaded over all or nearly so; slotted, and burrs removed from head and slot.

Set Screws, with ground or polished heads, 10 per cent less discount. Set Screws, with heads polished after hardening, 20 per cent less discount.

(Continued on opposite page.)

CASE-HARDENED IRON SET SCREWS.

PRICE PER HUNDRED.

Diameter.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	
Length under Head.	$\frac{3}{4}$	2.00	2.20	2.50	2.90	3.40	4.25	5.00	. . .				
	1	2.15	2.35	2.65	3.10	3.60	4.25	5.00	7.00				
	$1\frac{1}{4}$	2.30	2.50	2.80	3.30	3.80	4.50	5.25	7.00	11.30			
	$1\frac{1}{2}$	2.45	2.65	2.95	3.50	4.00	4.75	5.50	7.50	11.30	14.90		
	$1\frac{3}{4}$	2.60	2.80	3.10	3.70	4.20	5.00	5.75	8.00	12.00	15.90	19.50	
	2	2.80	3.00	3.30	3.95	4.45	5.30	6.05	8.60	12.90	17.00	21.10	25.30
	$2\frac{1}{4}$	3.05	3.25	3.55	4.25	4.75	5.65	6.40	9.30	13.80	18.40	22.90	27.40
	$2\frac{1}{2}$	3.30	3.55	3.85	4.60	5.10	6.05	6.80	10.00	14.80	19.80	24.70	29.60
	$2\frac{3}{4}$	3.55	3.85	4.20	5.00	5.50	6.50	7.25	10.80	15.90	21.40	26.70	32.00
	3	3.80	4.15	4.55	5.45	5.95	7.00	7.80	11.70	17.10	23.00	28.80	34.60
	$3\frac{1}{4}$	. . .	4.45	4.90	5.90	6.45	7.55	8.35	12.70	18.40	24.70	31.00	37.40
	$3\frac{1}{2}$	. . .	. . .	5.25	6.35	6.95	8.10	8.95	13.70	19.70	26.40	33.20	40.20
	$3\frac{3}{4}$	. . .	. . .	. . .	6.80	7.45	8.65	9.55	14.70	21.00	28.10	35.40	43.00
	4	. . .	. . .	. . .	. . .	7.95	9.20	10.15	15.70	22.30	29.80	37.60	45.80
	$4\frac{1}{4}$	. . .	. . .	. . .	. . .	. . .	9.75	10.75	16.70	23.60	31.50	39.80	48.60
	$4\frac{1}{2}$	. . .	. . .	. . .	. . .	. . .	. . .	11.35	17.70	24.90	33.20	42.00	51.40
	$4\frac{3}{4}$	. . .	. . .	. . .	. . .	. . .	. . .	. . .	18.70	26.20	34.90	44.20	54.20
5	. . .	. . .	. . .	. . .	. .	. .			27.50	36.60	46.40	57.00	
Threads to Inch.	20	18.	.16	14	13	12	11	10	9	8	7	7	
Add for each $\frac{1}{4}$ Inch.	.25	.30	.35	.45	.50	.55	.60	1.00	1.30	1.70	2.20	2.80	

In ordering Set Screws, please state whether you want Cup or Oval Points.
In ordering Screws $\frac{1}{2}$ inch diameter, please state whether wanted with 12 or 13 threads. The latter always sent unless otherwise stated.

CAP SCREWS.

HEXAGON HEADS.

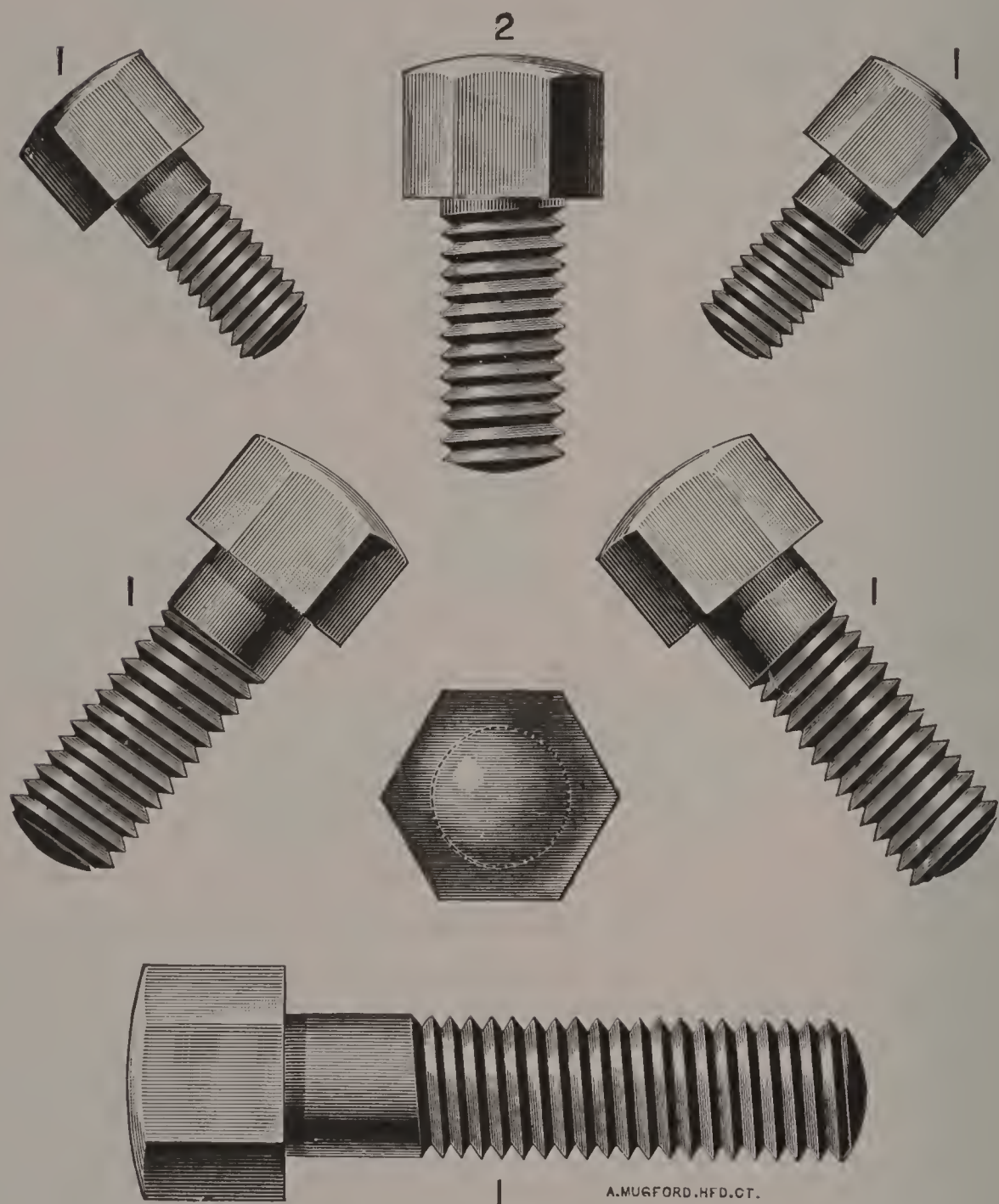


Figure 403.

PRICE PER HUNDRED.

Diameter Head.	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Length Head.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
Threads to inch.	20	18	16	14	13	12	11	10	9	8	7	7
Diameter Screw.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
Length under Head.	$\frac{3}{4}$	3.00	3.25	3.75	4.40	5.50	7.00	.....	.....	.....	.....	.....
	1	3.25	3.50	4.00	4.70	5.70	7.00	9.50	.....	.....	.....	.....
	$1\frac{1}{4}$	3.50	3.75	4.25	5.00	6.00	7.50	9.50	12.20	.....	.....	.....
	$1\frac{1}{2}$	3.75	4.00	4.50	5.30	6.30	8.00	10.00	12.20	16.00	.....	.....
	$1\frac{3}{4}$	4.00	4.25	4.75	5.60	6.60	8.50	10.60	12.80	16.60	21.20	.....
	2	4.25	4.60	5.05	5.95	7.00	9.10	11.20	13.40	17.20	22.30	29.00
	$2\frac{1}{4}$	4.55	5.00	5.40	6.35	7.50	9.70	11.90	14.10	17.90	23.60	30.50
	$2\frac{1}{2}$	4.85	5.40	5.80	6.80	8.00	10.40	12.70	14.90	18.80	25.10	32.30
	$2\frac{3}{4}$	5.15	5.80	6.30	7.30	8.60	11.20	13.60	15.90	20.00	26.90	34.40
	3	5.45	6.20	6.80	7.90	9.30	12.10	14.70	17.00	21.80	29.00	37.00
	$3\frac{1}{4}$	... ..	6.60	7.30	8.50	10.10	13.10	16.00	18.60	23.80	31.40	40.00
	$3\frac{1}{2}$	... ..	... ..	7.80	9.10	10.90	14.10	17.30	20.20	25.80	33.80	43.00
	$3\frac{3}{4}$	... ..	... ..	... ..	9.70	11.70	15.10	18.60	21.80	27.80	36.20	46.00
	4	... ..	... ..	... ..	... ..	12.50	16.10	19.90	23.40	29.80	38.60	49.00
	$4\frac{1}{4}$	... ..	... ..	... ..	... ..	... ..	17.10	21.20	25.00	31.80	41.00	52.00
	$4\frac{1}{2}$	... ..	... ..	... ..	... ..	... ..	... ..	22.50	26.60	33.80	43.40	55.00
	$4\frac{3}{4}$	... ..	... ..	... ..	... ..	... ..	... ..	... ..	28.20	35.80	45.80	58.00
	5	... ..	... ..	... ..	... ..	... ..	... ..	... ..	... ..	37.80	48.20	61.00
Add for ea. $\frac{1}{4}$ inch.	.30	.40	.50	.60	.80	1.00	1.30	1.60	2.00	2.40	3.00	4.00

On all Screws of 1 inch and less in diameter, and less than 4 inches long, threads are cut three-fourths of the length; beyond 4 inches, threads are cut half of the length.

In ordering Screws $\frac{1}{2}$ inch in diameter, please state whether wanted with 12 or 13 threads.

PATENT IRON WOOD SCREWS.

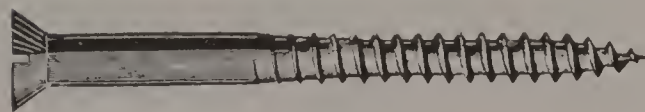


Figure 404.
FLAT HEAD.

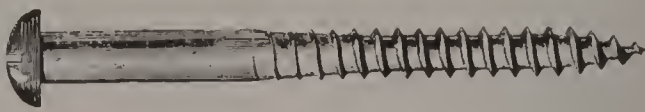


Figure 405.
ROUND HEAD.

PRICE PER GROSS.

1/4 Inch.		3/8 Inch.		1/2 Inch.		5/8 Inch.		3/4 Inch.		7/8 Inch.		1 Inch.	
No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
0 @	.72	0 @	.72	1 @	.72	1 @	.72	2 @	.72	2 @	.74	3 @	.80
1 "	.72	1 "	.72	2 "	.72	2 "	.72	3 "	.75	3 "	.78	4 "	.84
2 "	.72	2 "	.72	3 "	.72	3 "	.72	4 "	.78	4 "	.82	5 "	.87
3 "	.72	3 "	.72	4 "	.75	4 "	.75	5 "	.82	5 "	.85	6 "	.92
4 "	.72	4 "	.72	5 "	.78	5 "	.78	6 "	.85	6 "	.90	7 "	.98
10		5 "	.75	6 "	.80	6 "	.82	7 "	.90	7 "	.94	8 "	1.05
		6 "	.78	7 "	.84	7 "	.86	8 "	.95	8 "	1.00	9 "	1.10
		7 "	.82	8 "	.90	8 "	.92	9 "	1.00	9 "	1.05	10 "	1.20
		8 "	.88	9 "	.96	9 "	.98	10 "	1.10	10 "	1.15	11 "	1.30
		9 "	.94	10 "	1.05	10 "	1.07	11 "	1.15	11 "	1.25	12 "	1.40
1 1/4 Inch.		1 1/2 Inch.		1 3/4 Inch.		2 Inch.		2 1/4 Inch.		2 1/2 Inch.		2 3/4 Inch.	
No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
3 @	.88	3 @	.98	5 @	1.30	5 @	1.45	5 @	1.55	5 @	1.90	6 @	2.40
4 "	.92	4 "	1.05	6 "	1.35	6 "	1.50	6 "	1.60	6 "	2.00	7 "	2.60
5 "	.98	5 "	1.10	7 "	1.45	7 "	1.55	7 "	1.65	7 "	2.10	8 "	2.70
6 "	1.05	6 "	1.15	8 "	1.50	8 "	1.60	8 "	1.75	8 "	2.20	9 "	2.80
7 "	1.10	7 "	1.20	9 "	1.55	9 "	1.65	9 "	1.85	9 "	2.30	10 "	2.90
8 "	1.15	8 "	1.30	10 "	1.60	10 "	1.75	10 "	1.95	10 "	2.40	11 "	3.00
9 "	1.20	9 "	1.35	11 "	1.70	11 "	1.85	11 "	2.05	11 "	2.50	12 "	3.10
10 "	1.30	10 "	1.40	12 "	1.80	12 "	2.00	12 "	2.20	12 "	2.60	13 "	3.20
11 "	1.40	11 "	1.50	13 "	2.00	13 "	2.20	13 "	2.35	13 "	2.70	14 "	3.30
12 "	1.55	12 "	1.65	14 "	2.25	14 "	2.45	14 "	2.65	14 "	2.90	15 "	3.60
13 "	1.70	13 "	1.80	15 "	2.60	15 "	2.75	15 "	3.10	15 "	3.30	16 "	3.90
14 "	1.90	14 "	2.00	16 "	2.90	16 "	3.10	16 "	3.50	16 "	3.65	17 "	4.50
15 "	2.15	15 "	2.35	17 "	3.50	17 "	3.70	17 "	3.85	17 "	4.20	18 "	5.00
16 "	2.50	16 "	2.80	18 "	4.00	18 "	4.20	18 "	4.55	18 "	4.70	19 "	5.80
17 "	2.75	17 "	3.20	19 "	4.50	19 "	4.80	19 "	5.30	19 "	5.80	20 "	6.10
18 "	3.30	18 "	3.80	20 "	5.20	20 "	5.50	20 "	6.10	20 "	6.70	21 "	7.20
19 "	4.00	19 "	4.30	21 "	6.00	21 "	6.40	21 "	6.90	21 "	7.50	22 "	8.50
20 "	4.80	20 "	5.10	22 "	6.80	22 "	7.20	22 "	7.80	22 "	8.40	*The number of Gross in a Bundle is indicated by small figures on the side, divided by a star (*).	
21 "	5.40	21 "	5.90	23 "	7.50	23 "	8.00	23 "	8.60	23 "	9.20		
3 Inch.		3 1/2 Inch.		4 Inch.		4 1/2 Inch.		5 Inch.		6 Inch.			
No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$		
6 @	2.95	8 @	3.90	8 @	4.90	12 @	7.00	12 @	8.10	12 @	10.00		
7 "	3.00	9 "	4.00	9 "	5.10	13 "	7.20	13 "	8.30	13 "	10.30		
8 "	3.05	10 "	4.10	10 "	5.20	14 "	7.60	14 "	8.60	14 "	11.00		
9 "	3.10	11 "	4.20	11 "	5.30	15 "	7.85	15 "	9.10	15 "	11.60		
10 "	3.15	12 "	4.30	12 "	5.40	16 "	8.15	16 "	9.70	16 "	12.40		
11 "	3.20	13 "	4.40	13 "	5.60	17 "	8.60	17 "	10.10	17 "	13.00		
12 "	3.30	14 "	4.50	14 "	5.90	18 "	9.15	18 "	11.00	18 "	14.50		
13 "	3.40	15 "	4.75	15 "	6.20	19 "	9.65	19 "	11.50	19 "	15.00		
14 "	3.50	16 "	4.95	16 "	6.50	20 "	10.20	20 "	12.00	20 "	16.00		
15 "	3.80	17 "	5.40	17 "	7.00	21 "	10.75	21 "	12.50	21 "	17.00		
16 "	4.20	18 "	6.15	18 "	7.60	22 "	11.20	22 "	13.00	22 "	18.00		
17 "	4.80	20 "	7.30	20 "	8.60	23 "	11.75	23 "	13.50	23 "	19.00		
18 "	5.50	22 "	8.70	22 "	9.70	24 "	12.30	24 "	14.00	24 "	20.00		
20 "	6.50	24 "	10.20	24 "	11.20	25 "	12.85	25 "	14.50	25 "	21.00		
22 "	7.50	26 "	12.00	26 "	14.00	26 "	16.00	26 "	18.00	26 "	23.00		
24 "	8.70			28 "	16.00	28 "	18.50	28 "	21.00	28 "	27.00		
26 "	10.50			30 "	18.50	30 "	21.50	30 "	24.00	30 "	30.50		

The following varieties of Iron Screws are invoiced from this list at varying discounts: Flat, Round, Fillister and Oval Head Screws, Dowel and Felloe Screws, Bright, Blued, Brassed, Bronzed, Japanned, Lacquered and Tinned, also Drive Screws.

COLD PUNCHED NUTS.

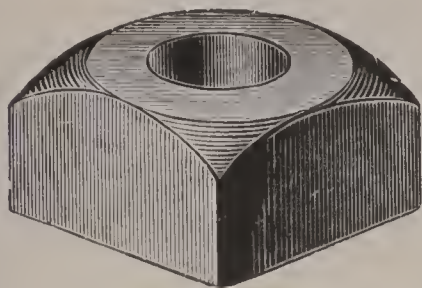


Figure 406.

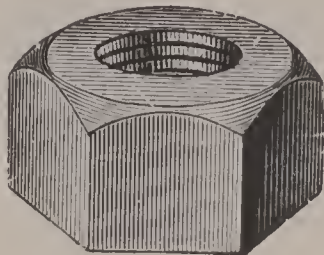


Figure 407.

CHAMFERED AND TRIMMED, WITH DRILLED HOLES.
UNITED STATES STANDARD SIZES.

PUNCHED TO SUIT U. S. OR FRANKLIN INSTITUTE STANDARD
TAPS.

Extra Cost of Tapping Nuts.

Wide.	Thick.	Hole.	Bolt.	Square, Price per Lb.		Hexagon, Price per Lb.	
				Blank.	Tapped.	Blank.	Tapped.
$\frac{3}{8}$	$\frac{3}{16}$	$\frac{5}{32}$ sct.	$\frac{3}{16}$	32.5	37.	48.	54.
$\frac{1}{2}$	$\frac{1}{4}$	$\frac{13}{64}$	$\frac{1}{4}$	20.	22.	27.	29.5
$\frac{19}{32}$	$\frac{5}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	18.	19.5	24.	26.
$\frac{11}{16}$	$\frac{3}{8}$	$\frac{19}{64}$	$\frac{3}{8}$	14.5	15.6	18.5	20.1
$\frac{25}{32}$	$\frac{7}{16}$	$\frac{11}{32}$	$\frac{7}{16}$	14.	15.3	18.	19.3
$\frac{3}{2}$	$\frac{1}{2}$	$\frac{25}{64}$	$\frac{1}{2}$	11.3	12.	14.	15
$\frac{31}{32}$	$\frac{9}{16}$	$\frac{26}{64}$	$\frac{9}{16}$	11.3	11.9	14.	14.9
$1\frac{1}{16}$	$\frac{5}{8}$	$\frac{33}{64}$	$\frac{5}{8}$	10.	10.5	12.5	13.2
$1\frac{1}{4}$	$\frac{3}{4}$	$\frac{36}{64}$	$\frac{3}{4}$	9.4	9.8	10.9	11.5
$1\frac{1}{4}$	$\frac{3}{4}$	$\frac{37}{64}$	$\frac{3}{4}$	9.4	9.8	10.9	11.5
$1\frac{7}{16}$	$\frac{7}{8}$	$\frac{47}{64}$	$\frac{7}{8}$	9.4	9.8	10.9	11.5
$1\frac{1}{2}$	1	$\frac{27}{32}$	1	9.4	9.8	10.9	11.5
$1\frac{13}{16}$	$1\frac{1}{8}$	$\frac{15}{16}$	$1\frac{1}{8}$	9.4	9.8	10.9	11.5
2	$1\frac{1}{4}$	$1\frac{1}{16}$	$1\frac{1}{4}$	10.1	10.5	11.5	12.1
$2\frac{3}{16}$	$1\frac{3}{8}$	$1\frac{5}{32}$	$1\frac{3}{8}$	10.3	10.8	12.	12.7
$2\frac{8}{16}$	$1\frac{1}{2}$	$1\frac{9}{32}$	$1\frac{1}{2}$	10.7	11.3	12.6	13.4
$2\frac{9}{16}$	$1\frac{3}{4}$	$1\frac{8}{16}$	$1\frac{3}{4}$	11.1	11.8	13.2	14.1
$2\frac{4}{16}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	11.5	12.2	14.	14.9
$2\frac{15}{16}$	$1\frac{7}{8}$	$1\frac{5}{8}$	$1\frac{7}{8}$	12.	12.8	14.5	15.5
3	2	$1\frac{23}{32}$	2	12.	12.9	14.5	15.6
$3\frac{1}{8}$	$2\frac{1}{8}$	$1\frac{13}{16}$	$2\frac{1}{8}$	12.5	13.5	15.	16.2
$3\frac{5}{16}$	$2\frac{1}{4}$	$1\frac{15}{16}$	$2\frac{1}{4}$	12.5	13.6	15.	16.3
$3\frac{1}{2}$	$2\frac{3}{8}$	$2\frac{1}{16}$	$2\frac{3}{8}$	13.5	14.7	16.	17.4
* $3\frac{11}{16}$	$2\frac{1}{2}$	$2\frac{3}{16}$	$2\frac{1}{2}$	13.5	14.8	16.	17.5
$3\frac{7}{8}$	$2\frac{5}{8}$	$2\frac{5}{16}$	$2\frac{5}{8}$	14.	15.4	16.5	18.1
$4\frac{1}{16}$	$2\frac{3}{4}$	$2\frac{7}{16}$	$2\frac{3}{4}$	14.	15.4	16.5	18.1
$4\frac{1}{4}$	3	$2\frac{11}{16}$	3	14.5	16.	17.	18.7
$4\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{15}{16}$	$3\frac{1}{4}$	14.5	15.1	17.	18.8
5	$3\frac{1}{2}$	$3\frac{5}{32}$	$3\frac{1}{2}$	14.5	15.2	17.	18.9
$5\frac{3}{4}$	$3\frac{3}{4}$	$3\frac{8}{16}$	$3\frac{3}{4}$	15.5	17.2	18.	19.9
$6\frac{1}{8}$	4	$3\frac{9}{16}$	4	15.5	17.2	18	19.9

Nuts with holes differing from Standard Sizes, extra.
*Nuts for $2\frac{3}{8}$ in. Bolt and larger sizes are forged.

PUNCHED WASHERS.
STANDARD LIST.

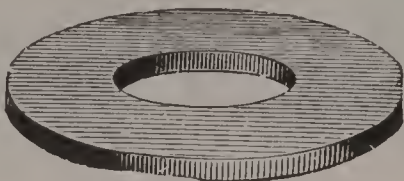


Figure 408.

In Keg Lots.

Diameter.	Size of Hole.	Thickness, Wire Gauge.	Size of Bolt.	Price per Pound.	Number in 100 Pounds.
$\frac{9}{16}$	$\frac{1}{4}$	No. 18	$\frac{3}{16}$	17.	39400
$\frac{3}{4}$	$\frac{5}{16}$	No. 16	$\frac{1}{4}$	12.5	13900
$\frac{7}{8}$	$\frac{3}{8}$	No. 16	$\frac{5}{16}$	11.5	11250
1	$\frac{7}{16}$	No. 14	$\frac{3}{8}$	10.5	6800
$1\frac{1}{4}$	$\frac{1}{2}$	No. 14	$\frac{7}{16}$	9.5	4300
$1\frac{3}{8}$	$\frac{9}{16}$	No. 12	$\frac{1}{2}$	9.	2600
$1\frac{1}{2}$	$\frac{5}{8}$	No. 12	$\frac{9}{16}$	9.	2250
$1\frac{3}{4}$	$1\frac{1}{16}$	No. 10	$\frac{5}{8}$	8.5	1300
2	$1\frac{3}{16}$	No. 10	$\frac{3}{4}$	8.5	1010
$2\frac{1}{4}$	$1\frac{5}{16}$	No. 9	$\frac{7}{8}$	8.5	860
$2\frac{1}{2}$	$1\frac{1}{16}$	No. 9	1	8.5	625
$2\frac{3}{4}$	$1\frac{1}{4}$	No. 9	$1\frac{1}{8}$	8.5	520
3	$1\frac{3}{8}$	No. 9	$1\frac{1}{4}$	8.5	400
$3\frac{1}{4}$	$1\frac{1}{2}$	No. 8	$1\frac{3}{8}$	9.	300
$3\frac{1}{2}$	$1\frac{5}{8}$	No. 8	$1\frac{1}{2}$	9.	260
$3\frac{3}{4}$	$1\frac{3}{4}$	No. 8	$1\frac{5}{8}$	9.	230
4	$1\frac{7}{8}$	No. 8	$1\frac{3}{4}$	9.	215
$4\frac{1}{4}$	2	No. 8	$1\frac{7}{8}$	9.	190
$4\frac{1}{2}$	$2\frac{1}{8}$	No. 8	2	9.	175
$4\frac{3}{4}$	$2\frac{3}{8}$	No. 6	$2\frac{1}{4}$	9.5	110
5	$2\frac{5}{8}$	No. 6	$2\frac{1}{2}$	9.5	91

WIRE ROPE.

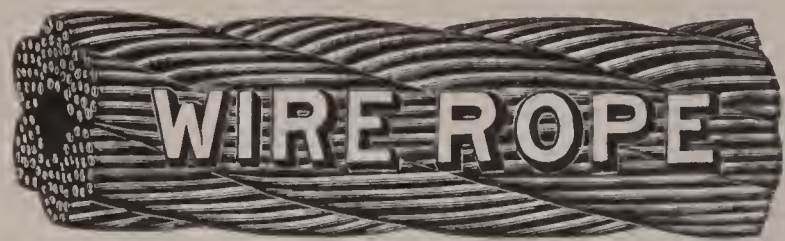


Figure 409.

STANDARD HOISTING ROPE.
19 Wires to the Strand.

Trade No.	Diameter.	LIST PER FOOT.			
		Iron.	Cast Steel.	Extra strong crucible steel.	Plough Steel.
1	2¼	\$1 17	\$1 42	\$1 70	\$2 00
2	2	92	1 11	1 34	1 56
3	1¾	80	93	1 15	1 35
4	1⅝	63	74	91	1 08
5	1½	57	66	80	93
5½	1⅜	48	56	67	77
6	1¼	40	46	55	63
7	1⅓	33	38	45	52
8	1	26	30	36	43
9	⅞	20	23	28	34
10	¾	16	18	22	26
10¼	⅝	12	14	16½	19
10½	⅙	10	12	14	16
10¾	½	08	11	12½	14
10a	⅞	07½	10	11½	13
10½	⅞	07	09½	11	12½
	⅞	06¾	09¼	10¾	12¼
	¾	06½	09	10½	12

TRANSMISSION AND STANDING ROPE.
7 Wires to the Strand.

Trade No.	Diameter.	LIST PER FOOT.			
		Iron.	Cast Steel.	Extra strong crucible steel.	Plough Steel.
11	1½	\$0 51	\$0 60	\$0 75	\$0 90
12	1⅜	43	51	64	75
13	1¼	36	43	53	61
14	1⅓	29	36	44	51
15	1	23	28	34	41
16	⅞	17½	22	26	32
17	¾	14	16	20	25
18	⅝	12	13½	17	20
19	⅝	10	11	14	17
20	⅙	08	09	11½	14
21	½	06½	07½	09½	11
22	⅞	05½	06½	07½	08
23	⅞	04½	05½	06	06½
24	⅞	03¾	04½	05½	06
25	¾	03¼	04	05	05½

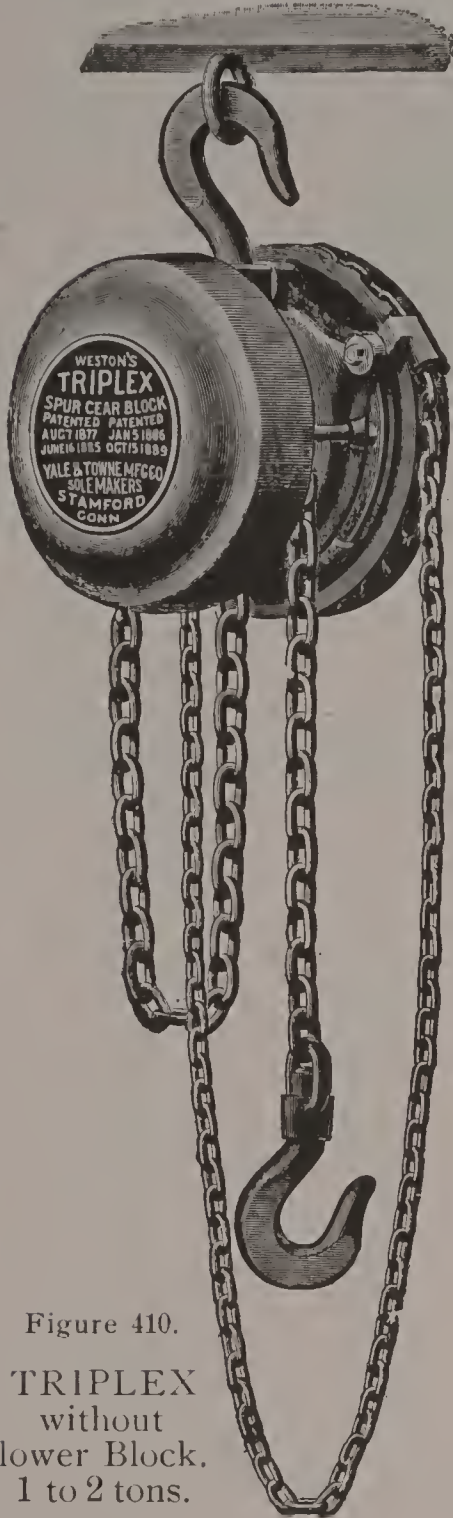


Figure 410.
TRIPLEX
without
lower Block.
1 to 2 tons.

TRIPLEX CHAIN BLOCK.

TRIPLE POWER.

TRIPLE SPEED.

TRIPLE DURABILITY.

This means that only 20 per cent. of the operator's labor is wasted in overcoming friction; showing that this type of block has twice the efficiency of blocks of the screw-gear type and triple the efficiency of those of the differential type. This can be seen by comparing the chain-pulls as given in the tables.

Customers are urged to make comparative tests to demonstrate these facts, and a triplex block will be furnished for such trial, with the privilege of return, if desired.

The triplex block is especially adapted for use with overhead cranes or trolleys, being faster and easier in operation than any other block operated by hand, and often available where otherwise the work could only be performed by power.

DUPLEX.—For portable and more frequent use.

TRIPLEX.—For constant use and best economy.

PRICE LIST.

Capacity in Tons.	Price Complete.	*Hoist in Feet.	Extra Hoist. Price per Foot.	Minimum Distance be- tween Hooks in inches.	†Reach.	Net Wt. in Lbs.	‡Chain Pull.	
							Pounds.	Feet.
½	\$35 00	8	\$1 15	15	9'-3"	51	62	21
1	45 00	8	1 20	17	9'-5"	89	82	31
1½	60 00	8	1 25	19½	9'-7½"	133	110	35
2	70 00	9	1 30	24	11'-0"	203	120	42
3	90 00	10	1 75	32	12'-8"	206	114	69
4	110 00	10	1 85	37	13'-1"	307	124	84
5	140 00	12	2 40	45	15'-9"	397	110	126
6	165 00	12	2 55	46	15'-10"	417	130	126
8	200 00	12	2 95	51	16'-3"	505	135	168
10	240 00	12	3 50	57	16'-9"	622	140	210

*Figures denote height in feet which blocks, with regular lengths of chain, will hoist from level on which operator stands.

†The Reach is the sum of the "Hoist" and the "Minimum Distance between Hooks."

‡Figures denote the pull in pounds required to lift the full load, and the number of feet of hand chain which must be handled to lift the load one foot.

DUPLEX BLOCK.

SCREW-GEARED. (Patented.)

This latest model of the Screw Block (worm wheel action) presents the perfection of this type and offers many attractive features.

Portable: Because light and compact.

Powerful: One man lifts a heavy load.

Convertible: To "Safety" or "Dispatch" lowering action as desired.

Its chain guides make it safe and convenient even when used at an angle.

This block is unequalled for portable use, where convenience in handling rather than speed of lifting is desired.

DUPLEX.—For portable and more frequent use.

TRIPLEX.—For constant use and best economy.

PRICE LIST.

Capacity in Tons.	Price Complete.	*Hoist in Feet	Extra Hoist Price per foot	Minim'm Distance between Hooks in inches	†Reach	Net Wt in Lbs.	‡Chain Pull	
							Lbs.	Ft.
1/2	\$25 00	8	\$1 25	13 1/4	9 ft 1 in	43	68	40
1	30 00	8	1 30	16 1/8	9 " 4 "	57	87	59
1 1/2	40 00	8	1 35	19 1/4	9 " 7 "	76	94	80
2	50 00	9	1 40	21 3/8	9 " 9 "	104	115	93
3 1/2	80 00	10	1 90	25 3/4	12 " 2 "	210	140	138
5	125 00	12	2 00	30 5/8	14 " 7 "	340	145	195
7	175 00	12	3 00	33 7/8	14 " 10 "	370	160	275
10	250 00	12	3 20	45 1/4	15 " 9 "	570	160	390

*Figures denote height in feet which blocks, with regular lengths of chain, will hoist from level on which operator stands.

†The Reach is the sum of the "Hoist" and the "Minimum Distance between Hooks." At this Reach or "Height of Suspension" the hand chain hangs down to within 18 inches of the floor.

‡Figures denote the pull in pounds required to lift the full load, and the number of feet of hand chain which must be handled to lift the load one foot.

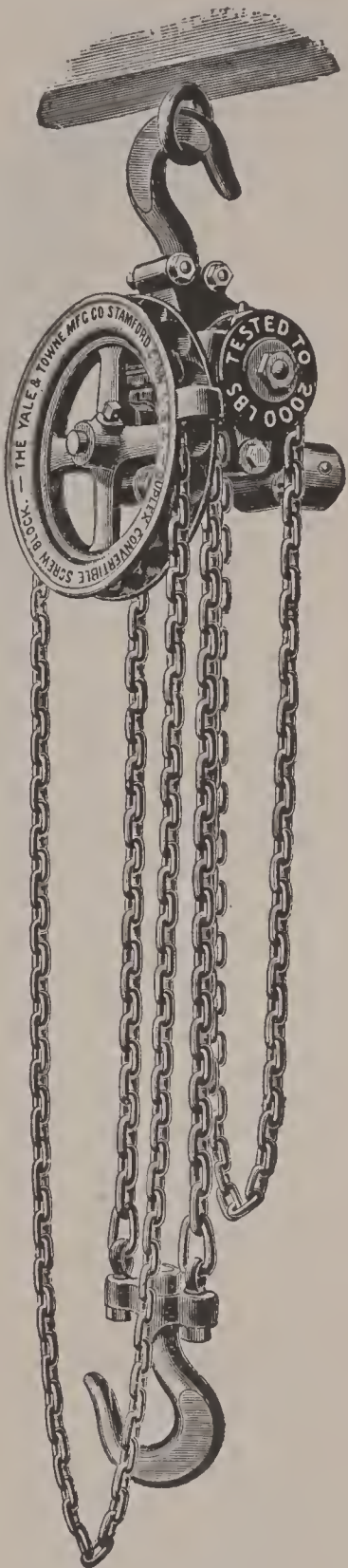


Figure 411.

DERRICKS.

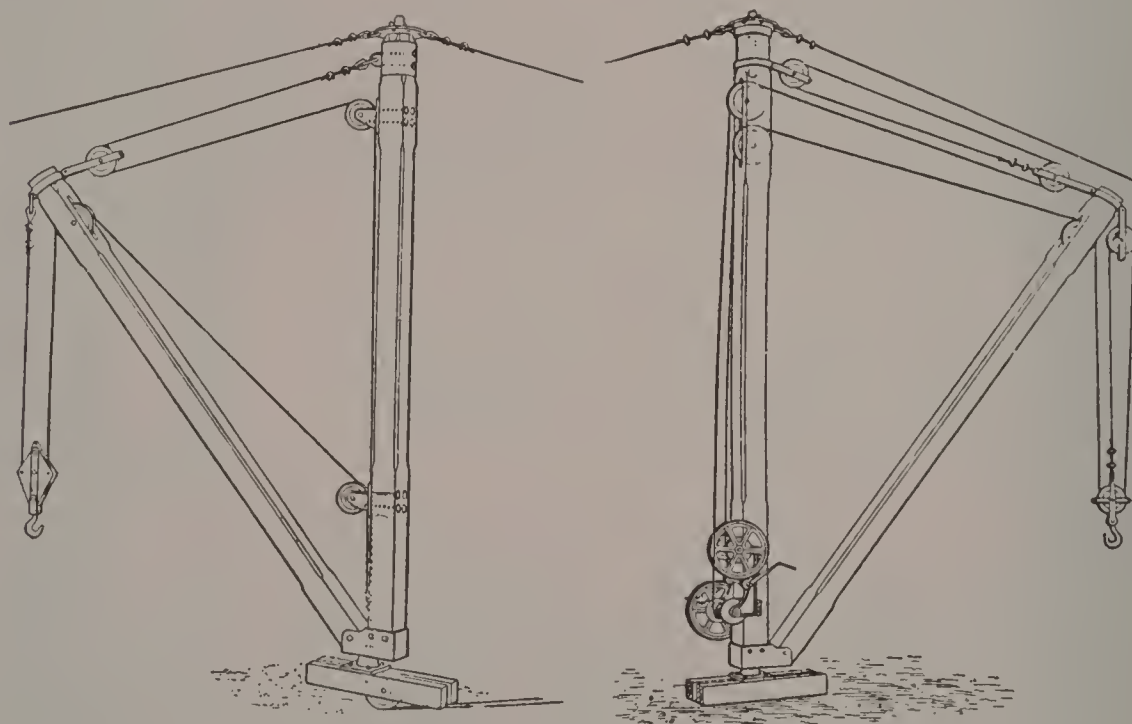
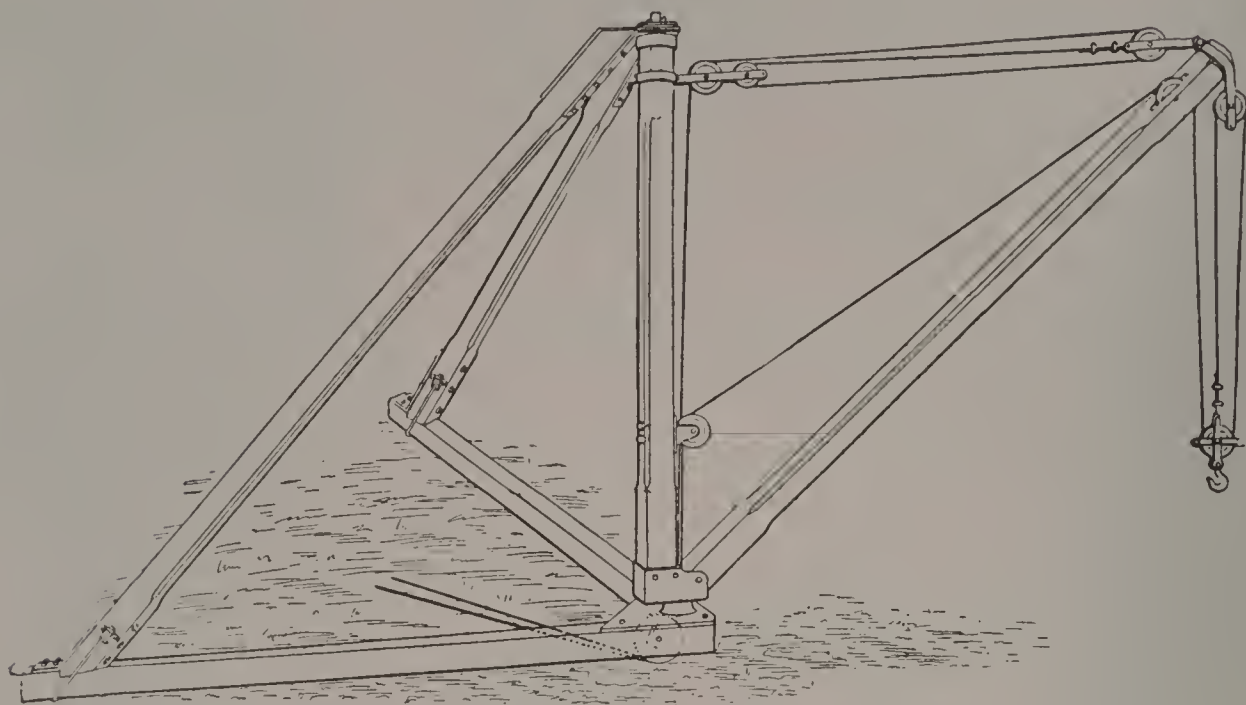


Figure 412.

Style B.

Style A.

Style C.

We can furnish complete cast and wrought iron work, sheaves and fittings for Derricks of any design.

Style A—Stiff Legged Derrick. Style B—Guy Derrick. Style C—Hand Power Derrick.

Prices quoted on application.

BLACKSMITHS' FORGES.

WITH SHEET-STEEL HOOD.

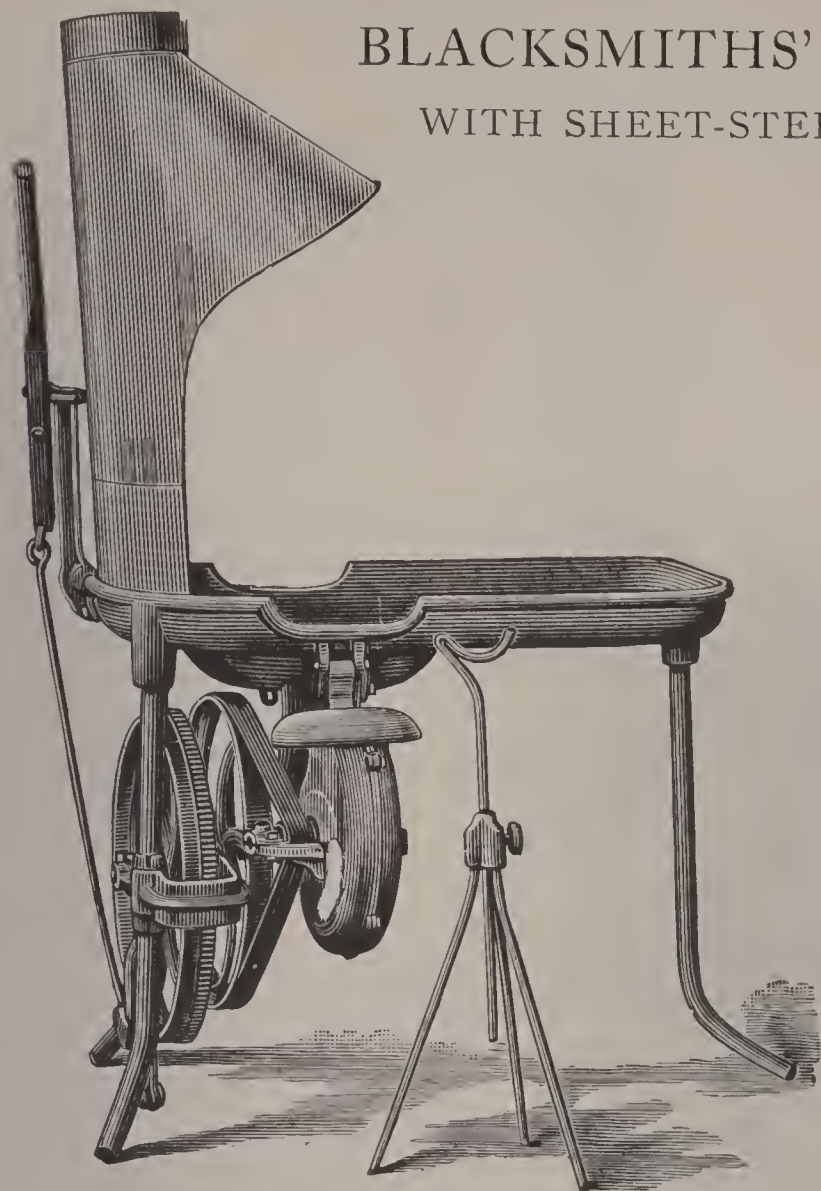


Figure 413.

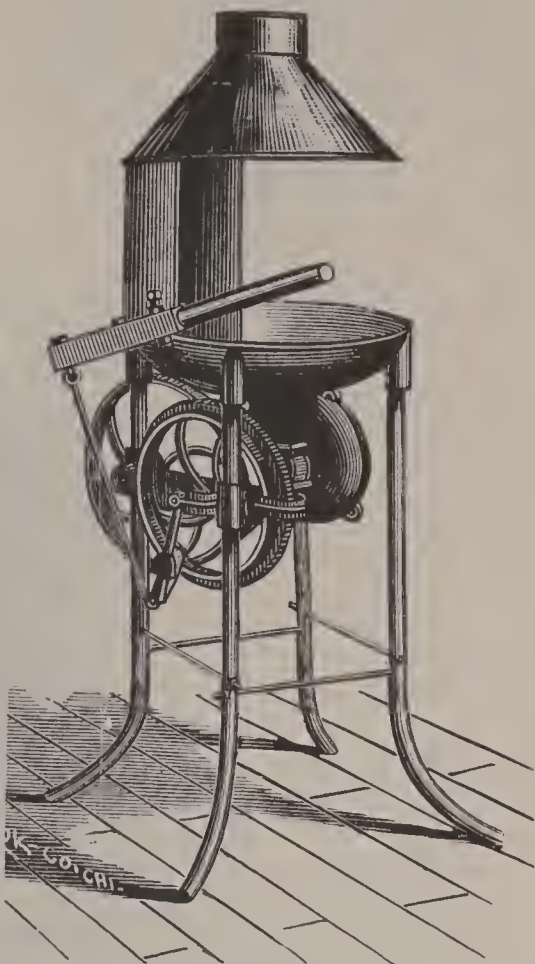


Figure 414.

STYLES AND LIST PRICES OF FORGES.

No.	Hood.	Bowl.	Fan.	Weight.	Price.
0	Half	28 x 40	14 in.	295	\$50 00
1	Half	21 x 27	10 in.	150	40 00
2	Closed	21 x 27	10 in.	150	42 00
3	Dash	21 x 27	10 in.	140	36 00
4	Half	18 in. dia.	8 in.	90	27 00
5	Dash	18 in. dia.	8 in.	90	24 00
6	Closed	18 in. dia.	8 in.	90	30 00
7	Dash	14 in. dia.	8 in.	45	16 00
8	Half	14 in. dia.	8 in.	45	18 00
9	Closed	14 in. dia.	8 in.	45	20 00
11	Half	18 in. dia.	10 in.	105	32 00
12	Dash	18 in. dia.	10 in.	105	29 00
13	Closed	18 in. dia.	10 in.	105	35 00
14	Half	22 x 30	10 in.	165	40 00
15	Dash	22 x 30	10 in.	165	36 00
16	Half	16 x 26	10 in.	109	27 00
17	Dash	16 x 26	10 in.	80	27 00
18	Half	16 x 26	10 in.	80	27 00
19	Dash	16 x 26	10 in.	80	24 00

Power Attachment for Nos. 0, 1, 2, 3.....\$ 4.00
Blowers No. 60, 8 in..... 8.00
Blowers No. 66, 12 in..... 10.00
Blowers No. 70, 18 in..... 14.00
Exhausters, add \$2.00 to each price. Write for special discounts.

ROCK DRILLS AND AIR COMPRESSORS.

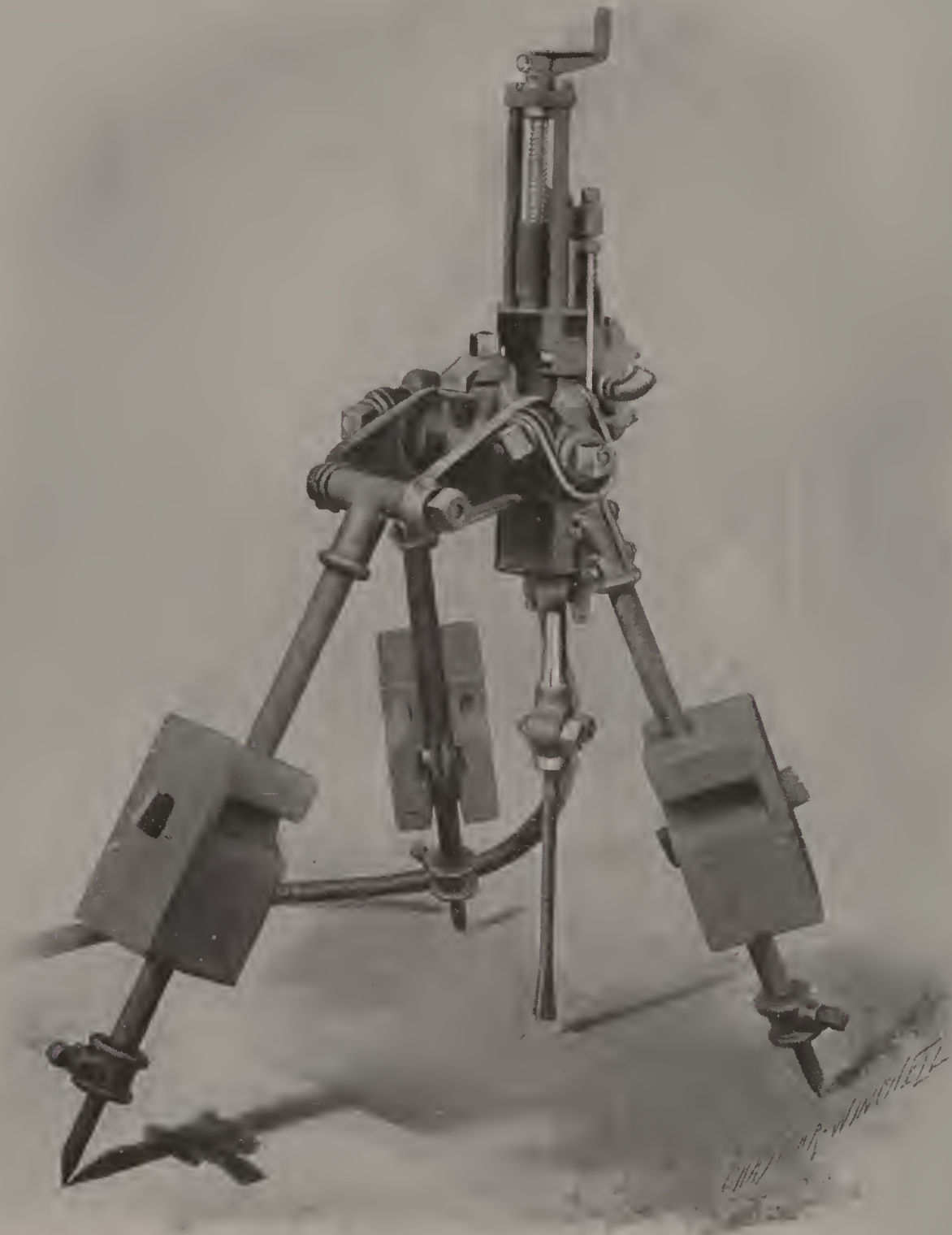


Figure 415.

Rock Drill on Adjustable Tripod. (Rear View.)

Prices on Rock Drills and Air Compressors quoted on application.

Data required for Air Compressors.

When writing for prices or other information pertaining to air compressors, the following data should be furnished:

1. Volume of free air per minute required.
2. Working air pressure.
3. Number, size and kind of machines to be operated by the compressed air.
4. If for pumping, give make, size and speed of pump, and height to which water must be delivered.
5. Altitude, if over 1,000 feet above sea level.
6. If for steam-actuated compressor, give working steam pressure.
7. If for belt or gear driven compressor, give power available, diameter of driving pulley or gear, etc.
8. Any design of compressor preferred.

The more full information regarding the special conditions under which the compressor is to be operated, the more closely can be determined the type of machine which will best meet the requirements of the case.

BAR IRON.

The Manufacturers' National Classification of Extras

Above the Base Price of Bar Iron.

SCHEDULE.

Round and Square Iron, 1 to 1 7/8 inches, } Regular Bar Sizes Not Extra.
Flat Iron, 1 1/2 to 4 inches x 3/8 to 1 inch, }

ROUND AND SQUARE IRON EXTRA.		Tenths of a Cent per lb.	
1/4 inch.....	9/10	1 1/8 inch to 1 3/8 x 3/8 to 1 ...	1/10
5/8 "	7/10	1 1/2 " to 4 x 1/4 to 1 5/8 ...	2/10
3/8 "	5/10	1 3/8 " to 4 x 1 1/8 to 1 1/2 ...	3/10
7/8 "	4/10	2 " to 4 x 1 5/8 to 2 ...	5/10
1/2 and 9/16	3/10	2 " to 4 x 2 1/8 to 3 ...	6/10
5/8 " 11/16	2/10	4 1/4 " to 6 x 1/4 to 1 5/8 ...	7/10
3/4 " 7/8	1/10	4 1/4 " to 6 x 3/8 to 1 ...	8/10
2 inches to 2 7/8 inches.....	1/10	4 1/4 " to 6 x 1 1/8 to 1 1/2 ...	9/10
3 " 3 1/2 "	5/10	4 1/4 " to 6 x 1 5/8 to 2 ...	10/10
3 5/8 " 4 "	8/10	4 1/4 " to 6 x 2 1/8 to 3 ...	11/10
		6 1/4 " to 8 x 1/4 to 1 5/8 ...	12/10
		6 1/4 " to 8 x 3/8 to 1 1/2 ...	13/10
		6 1/4 " to 8 x 1 5/8 to 2 ...	14/10
		6 1/4 " to 8 x 2 1/8 to 3 ...	15/10
			1
FLAT IRON, EXTRA.		OVAL IRON, EXTRA.	
1/2 x 1/8	1 4/10	7/8 to 1 1/2	4/10
1/2 x 3/16	1 3/10	3/4 to 1 3/8	5/10
1/2 x 1/4 and 5/16	1	5/8 to 1 1/2	6/10
1/2 x 3/8	9/10	1/2 to 1 1/8	7/10
5/8 x 1/8	1 1/10	3/8 to 1 7/8	8/10
5/8 x 3/16	1	1/2 to 9/16 x 3/16	9/10
5/8 x 1/4 and 5/16	8/10	5/8 to 1 1/8 x 1/8	10/10
5/8 x 3/8 and 1/2	5/10		
3/4 x 1/8	9/10	HALF-OVAL AND HALF-ROUND IRON, EXTRA.	
3/4 x 3/16	8/10	2 1/4 to 3	6/10
3/4 x 1/4 and 5/16	5/10	7/8 to 2	5/10
3/4 x 3/8 to 5/8	4/10	3/4 to 1 3/8	7/10
7/8 x 1/8	7/10	5/8 to 1 1/2	9/10
7/8 x 3/16	6/10	1/2 to 1 1/8	10/10
7/8 x 1/4 and 5/16	5/10	3/8 to 1 7/8	11/10
7/8 x 3/8 to 3/4	4/10	1 5/8	12/10
1 inch to 1 3/16 x 1/8	6/10	1/4	13/10
1 " to 1 3/8 x 3/16	5/10		
1 " to 1 3/8 x 1/4 to 1 5/8	3/10		
1 inch to 1 1/8 x 3/8 to 7/8 ...	2/10		

All sizes not enumerated subject to special agreement.

Extra, for cutting ordinary bars to specific lengths, from 2/10 to 3/10 of a cent per pound, according to length and size, as may be agreed upon.

Weight Per Foot of Round and Square Iron

Diameter in Inches.	Square Bars.	Round Bars.	Diameter in Inches.	Square Bars.	Round Bars.	Diameter in Inches.	Square Bars.	Round Bars.	Diameter in Inches.	Square Bars.	Round Bars.
$\frac{3}{16}$	.117	.092	$1\frac{5}{8}$	8.802	6.913	$3\frac{1}{8}$	32.55	25.57	7	163.3	128.3
$\frac{1}{4}$	.208	.164	$1\frac{11}{16}$	9.492	7.455	$3\frac{1}{4}$	35.21	27.65	$7\frac{1}{4}$	175.2	137.6
$\frac{5}{16}$	.326	.256	$1\frac{3}{4}$	10.21	8.018	$3\frac{3}{8}$	37.97	29.82	$7\frac{1}{2}$	187.5	147.3
$\frac{3}{8}$	.469	.368	$1\frac{13}{16}$	10.95	8.601	$3\frac{1}{2}$	40.83	32.07	$7\frac{3}{4}$	200.2	157.2
$\frac{7}{16}$	.638	.501	$1\frac{7}{8}$	11.72	9.204	$3\frac{5}{8}$	43.80	34.40	8	213.3	167.6
$\frac{1}{2}$	.833	.654	$1\frac{15}{16}$	12.51	9.828	$3\frac{3}{4}$	46.88	36.82	$8\frac{1}{4}$	226.9	178.2
$\frac{9}{16}$	1.055	.828	2	13.33	10.47	$3\frac{7}{8}$	50.05	39.31	$8\frac{1}{2}$	240.8	189.2
$\frac{5}{8}$	1.302	1.023	$2\frac{1}{16}$	14.18	11.14	4	53.33	41.89	$8\frac{3}{2}$	255.2	200.4
$\frac{11}{16}$	1.576	1.237	$2\frac{1}{8}$	15.05	11.82	$4\frac{1}{8}$	56.72	44.55	9	270.0	212.1
$\frac{3}{4}$	1.875	1.473	$2\frac{3}{16}$	15.95	12.53	$4\frac{1}{4}$	60.21	47.29	$9\frac{1}{4}$	285.2	224.0
$\frac{13}{16}$	2.201	1.728	$2\frac{1}{4}$	16.88	13.25	$4\frac{3}{8}$	63.80	50.11	$9\frac{1}{2}$	300.8	236.3
$\frac{7}{8}$	2.552	2.004	$2\frac{5}{16}$	17.83	14.00	$4\frac{1}{2}$	67.50	53.01	$9\frac{3}{4}$	316.9	248.9
$\frac{15}{16}$	2.930	2.301	$2\frac{3}{8}$	18.80	14.77	$4\frac{5}{8}$	71.30	56.00	10	333.3	261.8
1	3.333	2.618	$2\frac{7}{16}$	19.80	15.55	$4\frac{3}{4}$	75.21	59.07	$10\frac{1}{4}$	350.2	275.1
$1\frac{1}{16}$	3.763	2.955	$2\frac{1}{2}$	20.83	16.36	$4\frac{7}{8}$	79.22	62.22	$10\frac{1}{2}$	367.5	288.6
$1\frac{1}{8}$	4.219	3.313	$2\frac{9}{16}$	21.89	17.19	5	83.33	65.45	$10\frac{3}{4}$	385.2	302.5
$1\frac{3}{16}$	4.701	3.692	$2\frac{5}{8}$	22.97	18.04	$5\frac{1}{4}$	91.88	72.16	11	403.3	316.8
$1\frac{1}{4}$	5.208	4.091	$2\frac{11}{16}$	24.08	18.91	$5\frac{1}{2}$	100.8	79.19	$11\frac{1}{4}$	421.9	331.3
$1\frac{5}{16}$	5.742	4.510	$2\frac{3}{4}$	25.21	19.80	$5\frac{3}{4}$	110.2	86.56	$11\frac{1}{2}$	440.8	346.2
$1\frac{3}{8}$	6.202	4.950	$2\frac{13}{16}$	26.37	20.71	6	120.0	94.25	$11\frac{3}{4}$	460.2	361.4
$1\frac{7}{16}$	6.888	5.410	$2\frac{7}{8}$	27.55	21.64	$6\frac{1}{4}$	130.2	102.3	12	480.0	377.0
$1\frac{1}{2}$	7.500	5.890	$2\frac{15}{16}$	28.76	22.59	$6\frac{1}{2}$	140.8	110.6	.....	.....	.....
$1\frac{9}{16}$	8.138	6.392	3	30.00	23.56	$6\frac{3}{4}$	151.9	119.3	.....	.....	.....



THE D. A. TOMPKINS CO.,

CHARLOTTE, N. C.

COTTON SEED OIL MILL

Hullers

Separators

Crushers

Heaters

Presses

A Complete Line of Oil Mill
Machinery and Supplies

COTTON GINNING

Saw Gins

Roller Gins

We make plans for Oil Mills and furnish them with
machinery complete.



Figure 416.

Assembling Room.

(Oil Mill Machinery.)

We manufacture a large line of oil mill machinery. The number of repeat orders we are constantly receiving attest its superiority.

"The responsibility of the manufacturer is a guarantee that cannot be equalled."

COTTON SEED OIL MILL MACHINERY.

PRICE LIST.

No. 1 Sand & Boll Separating Screen for 20-ton mill, 50" x 10'	\$250 00
No. 2 Sand & Boll Separating Screen for 30-ton mill, 60" x 12'	300 00
No. 3 Sand & Boll Separating Screen for 40-ton mill, 60" x 14'	350 00
Additional for Blower	25 00
Additional for Magnet	25 00
Additional for Distributor	40 00
Cotton Seed Cleaner, 50-ton	300 00
106 Saw Linter, iron cylinder	400 00
Linter Saw Filing Machine, single head	205 00
Linter Saw Filing Machine, double head	255 00
Patent Saw Gummer	65 00
No. 1 Tompkins Huller, 80-ton	400 00
No. 2 Tompkins Huller, 30-ton	350 00
Adjustable Friction Feeder for Huller	50 00
Huller Knife Grinder, Automatic, 40-inch	250 00
Huller Knife Grinder, Semi-Automatic, 40-inch	175 00
No. 1 Meat and Hull Separating Screen for 20-ton mill, 50" x 10'	250 00
No. 2 Meat and Hull Separating Screen for 30-ton mill, 60" x 12'	300 00
No. 3 Meat and Hull Separating Screen for 40-ton mill, 60" x 14'	350 00
Additional for Beater	125 00
1 Set 3-high Belted Rolls, 24 inches long for 10-ton mill	750 00
1 Set 4-high Belted Rolls, 24 inches long for 15 to 30-ton mill	820 00
1 Set 4-high Belted Rolls, 30 inches long for 30 to 40-ton mill	950 00
1 Set 4-high Belted Rolls, 36 inches long for 30-ton mill	1,025 00
1 Set 4-high Belted Rolls, 42 inches long for 40-ton mill	1,110 00
1 Set 4-high Belted Rolls, 48 inches long for 60-ton mill	1,190 00
1 Set 5-high Belted Rolls, 30 inches long for 40-ton mill	1,100 00
1 Set 5-high Belted Rolls, 36 inches long for 60-ton mill	1,210 00
1 Set 5-high Belted Rolls, 42 inches long for 80-ton mill	1,310 00
1 Set 5-high Belted Rolls, 48 inches long for 100-ton mill	1,420 00
Single Heater, bottom drive 52 inches	600 00
Set of Two Heaters, bottom drive 52 inches	1,050 00
Triple Set of Two Cookers 52-inch, and 1 Heater, bottom drive	1,500 00
Set of Two Heaters, bottom drive 72 inches	1,450 00
Triple Set of Two Cookers 72-inch, and 1 Heater, bottom drive	1,800 00
No. 1 Patent Steam Carriage Former, 30, 60, 100-ton mill	850 00
No. 2 Steam Former with Hand Carriage, 10, 15, 20-ton mill	500 00
12-Plate Oil Press, 10 to 20-ton mill	1,400 00
15-Plate Oil Press, 15, 30, 60, 100-ton mill	1,550 00
Hydraulic Accumulator, high pressure	700 00
Hydraulic Accumulator, low pressure	700 00
No. 1 Tompkins Cake Cracker, 5 tons per hour	175 00
No. 5 Tompkins Cake Cracker, 10 tons per hour	250 00
No. 6 Scientific Combination Mill, 20-inch plates	280 00
No. 10 Scientific Combination Mill, 20-inch plates	380 00
No. 13 Scientific Attrition Mill, 22-inch plates	300 00
No. 13½ Scientific Attrition Mill, 24-inch plates	325 00
No. 14 Scientific Attrition Mill, 26-inch plates	400 00
No. 16 Scientific Attrition Mill, 30-inch plates	500 00
No. 19 Scientific Attrition Mill, 36-inch plates	600 00
Steam Hull Baling Press, 60 bales per hour	500 00
Hull Baling Press, 60 bales per hour	400 00
Hull Packer	350 00
Delinting Machine, 15 tons	1,300 00
Hull Delinting and Grinding Machine, 30 to 40 tons	300 00
Fertilizer Mixer, 7 to 10 tons	225 00
Fertilizer Mixer, 15 to 20 tons	500 00
Filter Press, for 60-ton mill	200 00
Filter Press, for 150-ton mill	250 00

APPROXIMATE COST OF COTTON SEED OIL MILL PLANTS.

Capacity for 24 hours, in tons.	Buildings, including Oil Mill, Boiler, Seed and Meal houses.	Land and R. R. Switch and Water Supply.	Press Room Machinery F. O. B. Factory.	All other Machinery in Oil Mill to make crude oil, and plans.	Freight and Erection	Total Oil Mill, Boilers and Seed and Meal house,	Refinery, including building and all machinery and plans.	Total Oil Mill and Refinery.	Ginnery, 6 stand Gins, and Cotton warehouse and plans.	Total Oil, Mill Gin- nery and Refinery.
10 to 15	\$ 5000 00	\$ 1000 00	\$ 4500 00	\$ 5000 00	\$ 2000 00	\$17500 00	\$11600 00	\$43000 00	\$15000 00	\$ 58000 00
20 to 30	10000 00	2000 00	6400 00	8500 00	4500 00	31400 00	15000 00	50000 00	15000 00	65000 00
30 to 40	10000 00	2000 00	8200 00	10000 00	4800 00	35000 00	15000 00	50000 00	15000 00	65000 00
60 to 80	15000 00	2000 00	12500 00	22000 00	8500 00	60000 00	25000 00	85000 00	15000 00	100000 00
100 to 120	22000 00	2500 00	18500 00	34500 00	12500 00	90000 00	35000 00	125000 00	15000 00	140000 00

Prices include Boilers, Engines, Sand and Boll Separators, Linters, Hullers, Meat and Hull Separators, Chilled Rolls, Heaters, Formers, Presses, Pumps, Cake Crackers, Meal Mills, Cotton Presses, Shafting, Belting, Hangers, Pulleys, Conveyors, Elevators.

COTTON SEED OIL MILL MACHINERY.

We include in the following prices on Oil Mill machinery the services of one man to superintend erection in the building. We include also a set of drawings of the necessary buildings, which must be built in accordance with the same in order that the machinery may be erected as designed. Our quotations are on the machinery necessary as per our drawings.

“Freight to eastern export point” is the additional price for which we will deliver machinery to any export city in the United States, east of the Rocky mountains.

“Freight to San Francisco” is the additional price for which we will deliver machinery to San Francisco.

In case of machinery purchased for foreign shipment we will box it suitably for export in place of furnished time of man to superintend erection. We will send a man with machinery to foreign countries if desired—price to be agreed upon—but purchaser to pay expenses in all cases.

We are always willing to furnish the special oil mill machinery which is manufactured by The D. A. Tompkins Company, and let purchasers buy the remaining machinery in the open market and themselves undertake the construction of the plant in accordance with our drawings or their own.

We are not willing, however, to furnish an itemized list of all machinery required with detailed prices and give an option to purchaser to strike out certain machinery, leaving us to furnish the remainder, for the reason that it might happen that the machinery stricken off the list and purchased from other sources might not work well with that remaining to be furnished by us.

After taking a contract, however, we will confer with purchasers, and furnish to any extent compatible with our interests such machinery as they prefer.

ONE PRESS (12 Plates) MILL COMPLETE.

Capacity 10 to 15 tons per 24 hours.

We build a complete Mill on a platform in our shops so constructed that we can take it to pieces for shipment. It is so marked that it can be easily set up by the marks.

The mill comprises the same list of machinery as is named for One-Press Mill, but the entire list of machinery is set up, shafting being carried on overhead supports. All the machinery is set up on a platform except the boiler and engine, which must be separately set up.

Price of this mill complete f. o. b. factory \$15,000 00

Cotton Seed Oil Mill Machinery (Continued).

APPROXIMATE COST OF MACHINERY FOR A

ONE PRESS (12 plates) OIL MILL.

Capacity 10 to 15 tons in 24 hours or 5 to 7 tons in 12 hours.

Special Oil Mill Machinery.

- One Sand and Boll Separator.
- One Meat and Hull Separator.
- One Standard 12-plate Press and Fixtures.
- One 52-inch Heater.
- One Set Chilled Rolls, 30-inch.
- One Cake Former (hand carriage).
- One Duplex Hydraulic Pump.
- One 3x3 Pump Tank.

Price f. o. b. \$ 5,300 00

Other Machinery Required.

- One 40-H. P. Boiler and Fixtures.
- One 30-H. P. Engine and Fixtures.
- One 106 Saw Carver Linter.
- One Standard Huller.
- One Cotton Press.
- One Cake Cracker { Combined.
- One Cake Mill }
- One 8x8 Oil Tank.
- Complete Set Drawings.
- Necessary Piping.
- Necessary Shafting, Pulleys and Hangers.
- Necessary Elevator Fixtures.
- Necessary Conveyors.
- Necessary Belting.

Price f. o. b. factory \$ 6,200 00

Total \$11,500 00

Freight to Eastern port 1,000 00

Freight to San Francisco 1,500 00

If it is desired to build a one press mill, so arranged and with sufficient power to change it to a 20 to 30-ton mill, it is necessary also to increase the separating machinery to the size used for 20 to 30-ton mill, and also to increase size and length of shafting, etc.

For machinery adapted in this way to increase size of mill, add to above price the sum of \$2,500.00.

Cotton Seed Oil Mill Machinery (Continued).

APPROXIMATE COST OF MACHINERY FOR A

TWO PRESS (12 plates each) OIL MILL.

Capacity 20 to 30 tons in 24 hours.

Special Oil Mill Machinery.

- One Sand and Boll Separator.
- One Meat and Hull Separator.
- Two Standard 12-plate Presses and Fixtures.
- One Set 52-inch Heaters (2).
- One Set Chilled Rolls (4 high) 36-inch.
- One Cake Former with Steam Carriage.
- One Duplex Hydraulic Pump.
- One 3½x3½ Pump Tank.

Price f. o. b. factory \$ 7,600 00

Other Machinery Required.

- One 80-H. P. Boiler and Fixtures.
- One 60-H. P. Engine and Fixtures.
- Four 106 Saw Carver Linters.
- One Standard Huller.
- One Cotton Press.
- One Cake Cracker.
- One Cake Mill.
- Two 10x10 Tanks for Oil.
- Complete Set Drawings.
- Necessary Piping.
- Necessary Shafting, Pulleys and Hangers.
- Necessary Elevator Fixtures.
- Necessary Conveyors.
- Necessary Belting.
- Necessary Sprinklers for Mill Building.
- One 30-light Electric Light Plant.
- Two Fire Hose for Mill.

Price f. o. b. factory \$ 12,000 00

Total \$ 19,600 00

Freight to Eastern port 2,500 00
Freight to San Francisco 3,200 00

Cotton Seed Oil Mill Machinery (Continued).

APPROXIMATE COST OF MACHINERY FOR A

TWO PRESS (15 plates each) OIL MILL.

Capacity 30 to 40 tons in 24 hours.

Special Oil Mill Machinery.

One Sand and Boll Separator.	
One Meat and Hull Separator.	
Two Standard 15-plate Presses and Fixtures.	
One Set 52-inch Heaters (2).	
One Set Chilled Rolls (4 high) 36-inch.	
One Cake Former (steam carriage).	
One Duplex Hydraulic Pump.	
One 3½x3½ Pump Tank.	
Price f. o. b.	\$ 9,000 00

Other Machinery Required.

One 90-H. P. Boiler and Fixtures.	
One 75-H. P. Engine and Fixtures.	
Five 106 Saw Carver Linters.	
One Standard Huller.	
One Cotton Press.	
One Cake Cracker.	
One Cake Mill.	
Two 12x12 Oil Tanks.	
Complete Set Drawings.	
Necessary Piping.	
Necessary Shafting, Pulleys and Hangers.	
Necessary Elevator Fixtures.	
Necessary Conveyors.	
Necessary Belting.	
Necessary Sprinklers for Mill Building.	
One 40-light Electric Plant.	
Two Fire Hose for Mill.	

Price f. o. b. factory	\$14,800 00
----------------------------------	-------------

Total	\$23,800 00
Freight to Eastern port	3,000 00
Freight to San Francisco	4,500 00

For the machinery for a 30 to 40-ton mill with sufficient power to operate a 4-press mill of 60 to 80 tons capacity and with the building and other machinery also arranged for the change, add to the above price f. o. b. factory 7,500 00

Cotton Seed Oil Mill Machinery (Continued).

APPROXIMATE COST OF MACHINERY FOR A

FOUR PRESS (15 plates each) OIL MILL.

Capacity 60 to 80 tons in 24 hours.	
Special Oil Mill Machinery.	
One Sand and Boll Separator.	
One Meat and Hull Separator.	
Four Standard 15-plate Presses.	
One Set 72-inch Heaters (2).	
One Set Chilled Rolls (4 high) 46-inch.	
One Cake Former with Steam Carriage.	
One Duplex Hydraulic Pump.	
One 4x4 Pump Tank.	
Price f. o. b. factory	\$14,000 00
Other Machinery Required.	
Two 90-H. P. Boilers and Fixtures.	
One 150-H. P. Engine and Fixtures.	
One National Feed Water Heater.	
Eight 106 Saw Carver Linters.	
One Standard Huller.	
One Cotton Press.	
One Cake Cracker.	
One Cake Mill.	
Two 15x15 Tanks for Oil.	
Complete Set Drawings.	
Necessary Piping.	
Necessary Shafting, Pulleys and Hangers.	
Necessary Elevator Fixtures.	
Necessary Conveyors.	
Necessary Belting.	
Necessary Sprinklers for Mill Building.	
One 50-light Electric Light Plant.	
Two Fire Hose for Mill.	
Price f. o. b. factory	\$29,000 00
Total	\$43,000 00
Freight to Eastern port	4,500 00
Freight to San Francisco	6,000 00
Four Press (15-plate) Oil Mill constructed with sufficient power and other machinery arranged for increasing to 6-press mill, price additional to 4-press mill as above	
	\$10,000 00

Cotton Seed Oil Mill Machinery (Continued).

APPROXIMATE COST OF MACHINERY FOR A

SIX PRESS (15 plates each) OIL MILL.

Capacity 100 to 130 tons in 24 hours.

Special Oil Mill Machinery.

- Two Sand and Boll Separators.
- Two Meat and Hull Separators.
- Six Standard 15-plate Presses.
- One Set 72-inch Heaters (3).
- One Set Chilled Rolls (4 high) 56-inch.
- One Cake Former (steam carriage).
- Two Duplex Hydraulic Pumps.
- One 4x4 Pump Tank.

Price f. o. b. \$21,000 00

Other Machinery Required.

- Four 80-H. P. Boilers and Fixtures.
- One 200-H. P. Engine.
- One National Feed Water Heater.
- Twelve 106 Saw Carver Linters.
- Two Standard Hullers.
- One Cotton Press.
- One Cake Cracker.
- One Cake Mill.
- Three 15x15 Oil Tanks.
- Complete Set Drawings.
- Necessary Piping.
- Necessary Shafting, Pulleys and Hangers.
- Necessary Elevator Fixtures.
- Necessary Conveyors.
- Necessary Belting.
- Necessary Sprinklers for Mill Building.
- One 75-light Electric Plant.
- Four Fire Hose for Mill.

Price f. o. b. factory \$44,500 00

Total \$65,500 00

Freight to Eastern port 6,000 00
Freight to San Francisco 8,500 00

TOMPKINS SAND AND BOLL SCREENS.

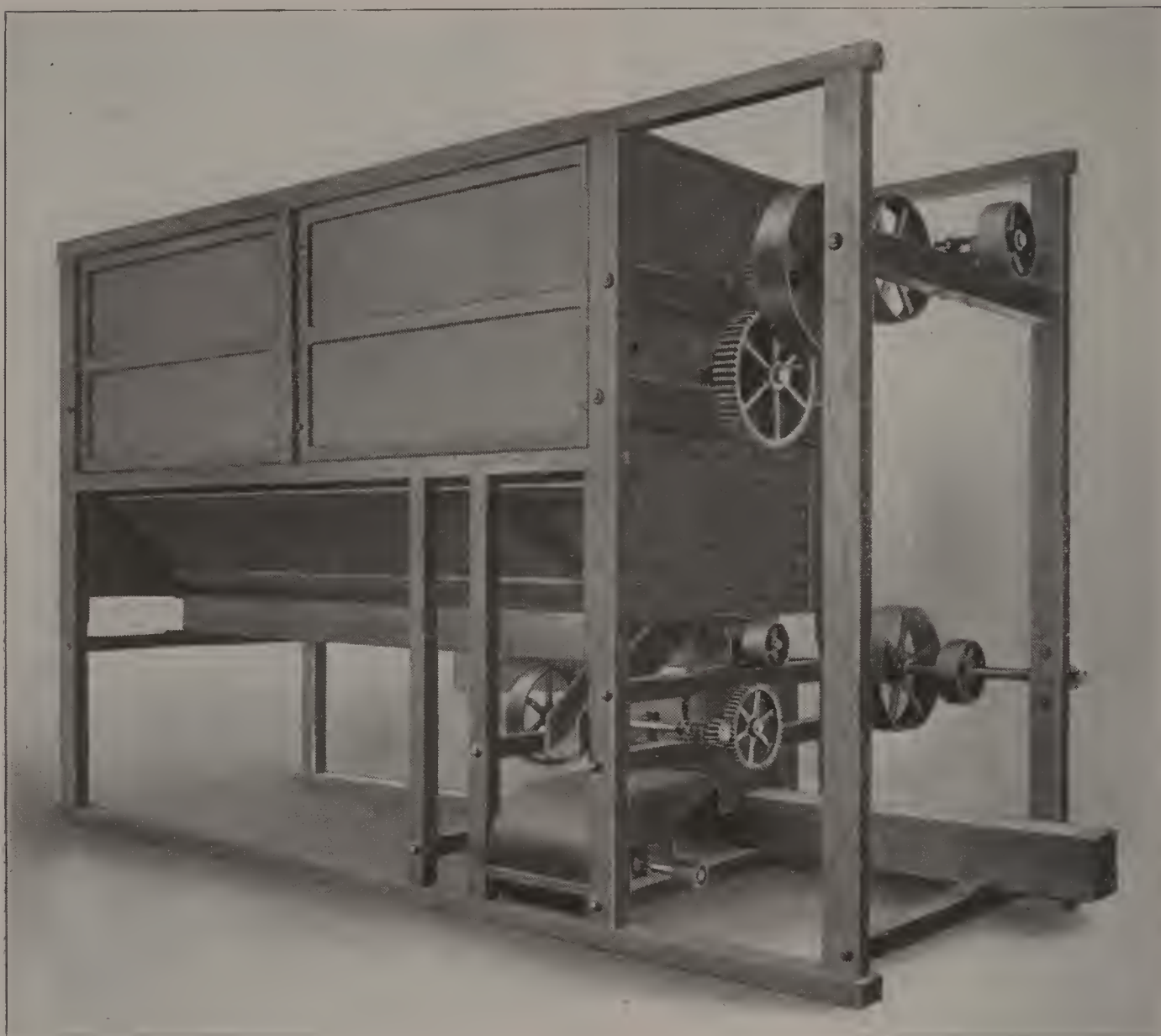


Figure 418.

Combined Sand and Boll Screen.

Made in our shops.

SAND AND BOLL SCREEN.

Is made to clean the seed. It takes out everything larger than a seed and also everything smaller than a seed. For mills of 40 tons capacity and under, we build the combination screen shown; for larger mills, we build two separate machines, one for sand and one for bolls. All of these machines are built complete in our shop, and shipped knocked down; but the parts are so carefully marked that there is no trouble in setting them up in the mill. Each machine is self contained, and complete within itself. One belt drives all the parts, including elevators and conveyors.

PRICE LIST.

Tompkins Sand and Boll Screens.

No. 1.	50 inches x 10 feet, 20 tons capacity	\$250 00
No. 2.	60 inches x 12 feet, 30 tons capacity	300 00
No. 3.	60 inches x 14 feet, 40 tons capacity	350 00
	For Blower, if desired, add	25 00
	For Magnet, if desired, add	25 00
	For Distributor, if desired, add	40 00



COTTON SEED LINTER.

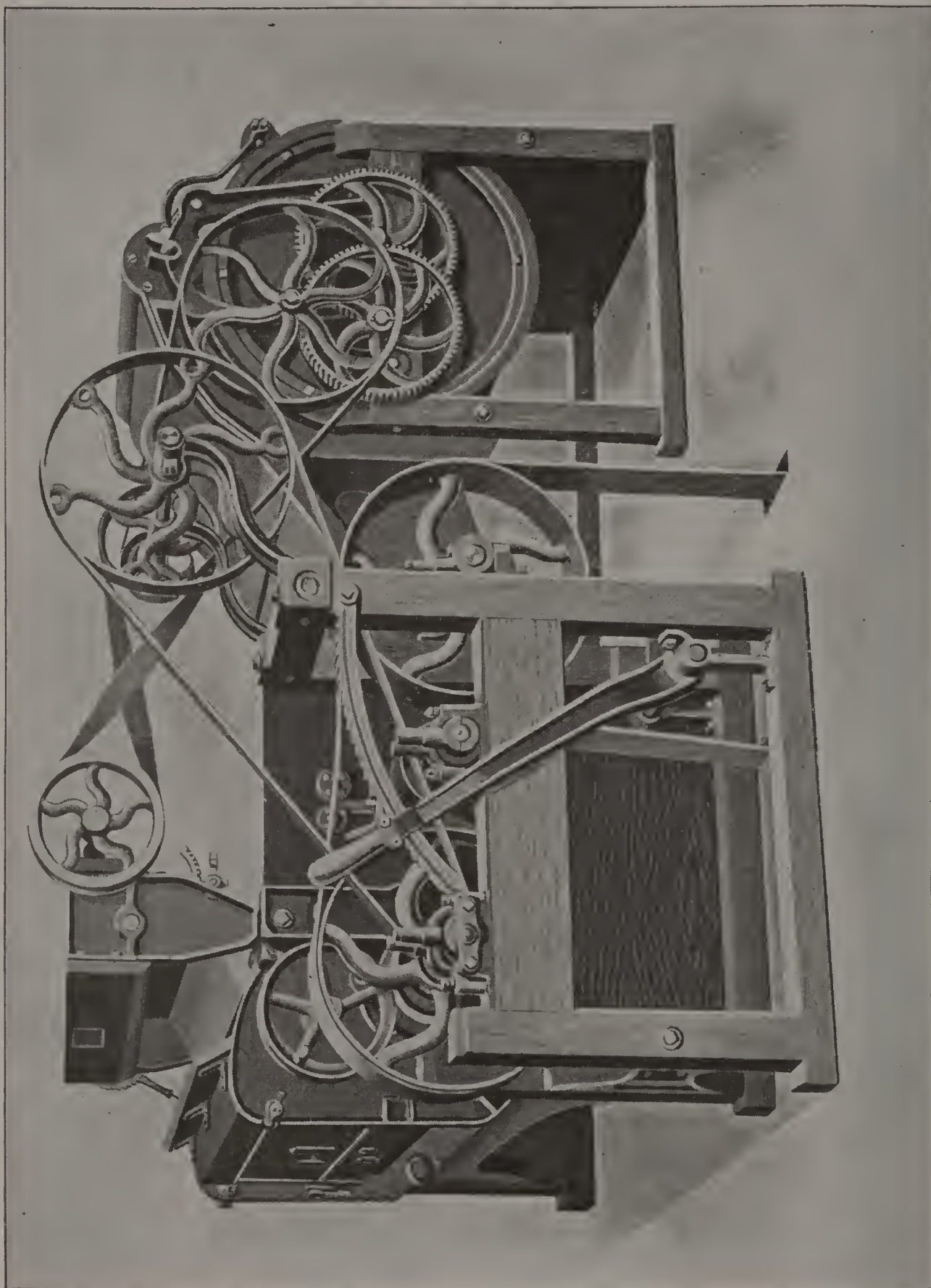


Figure 419.
Cotton Seed Linter.

This machine has 106 saws. The cylinder is made with iron or wood space blocks as desired. It has a capacity of 5 to 10 tons of seed per day of 24 hours. The less seed passed through one linter, the more lint is made per ton of seed.

PRICE LIST.

106-saw Linter (with Patent Iron Cylinder), Feeder and Condenser, with 1, 3, or 5-foot flue as required	\$400 00
Same machine as above except that it has a wood cylinder (with either sectional or whole saws) instead of iron cylinder	375 00

FILING MACHINE.

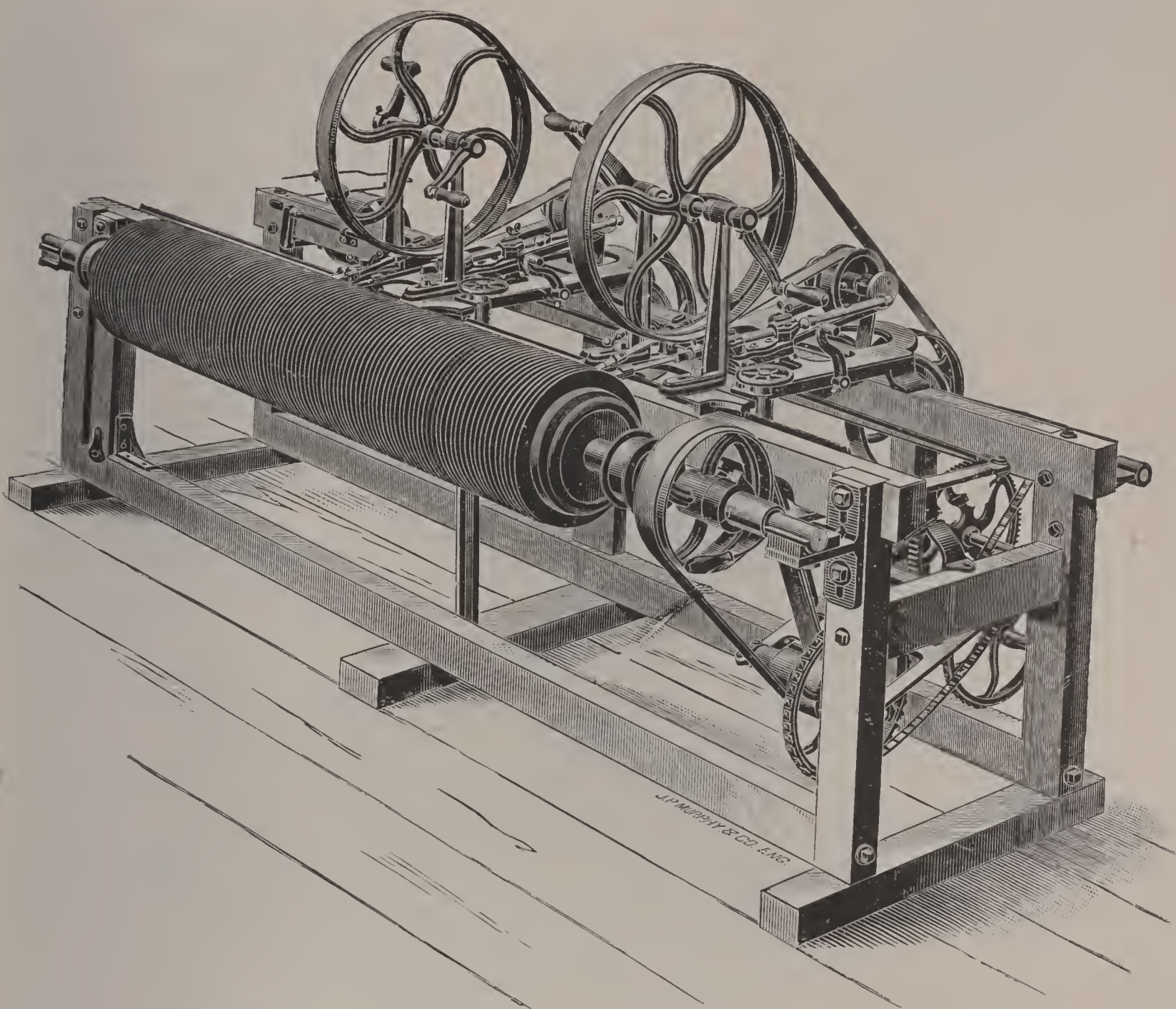


Figure 420.

Linter or Gin-Saw Filing Machine.

Linter saws should be sharpened frequently. The illustration shows a perfect machine for the purpose. We have them with single heads and with double heads. When desired, we furnish a gummer attachment, to keep the teeth in good shape, and keep them from wearing too short.

PRICE LIST.

For Linter-saw Filing Machine, with single head	\$205 00
For Linter-saw Filing Machine, with two heads	255 00
Patent Saw Gummer	65 00

TOMPKINS HULLER.

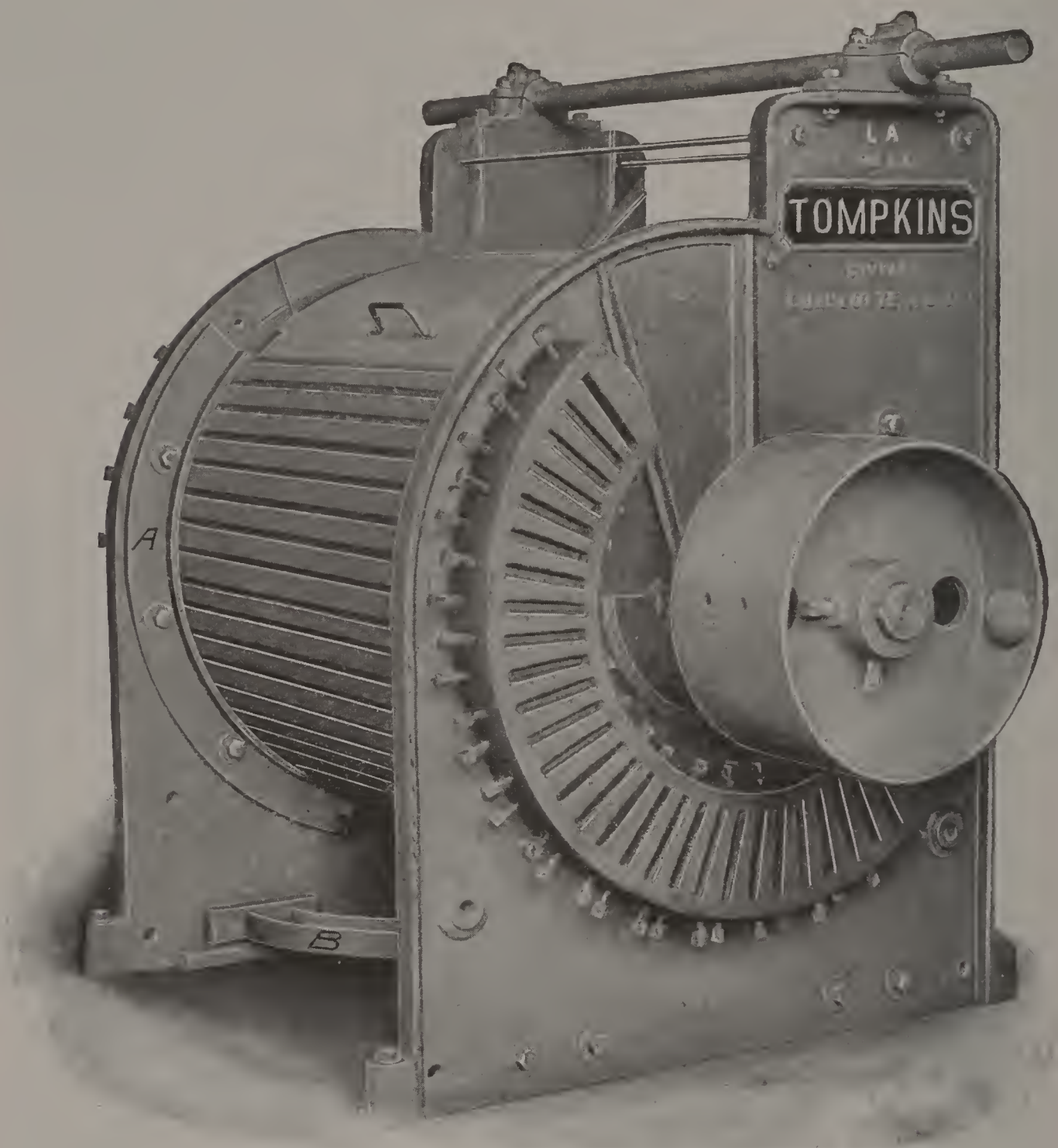


Figure 421.

Made in our shops.

	No. 1	No. 2
Size	30 inch	17 inch
Capacity, 24 hrs.....	80 tons	30 tons
H. P. required.....	25 H. P.	15 H. P.
Weight.....	3,500 Lbs.	2,500 Lbs.
Price	\$400 00	\$350 00
With Feed Roller	425 00	375 00
With Adjustable Friction Feeder.	450 00	400 00

Adjustable Friction Feeder, separate, Fig. 422 \$50 00

TOMPKINS HULLER AND SEPARATOR.

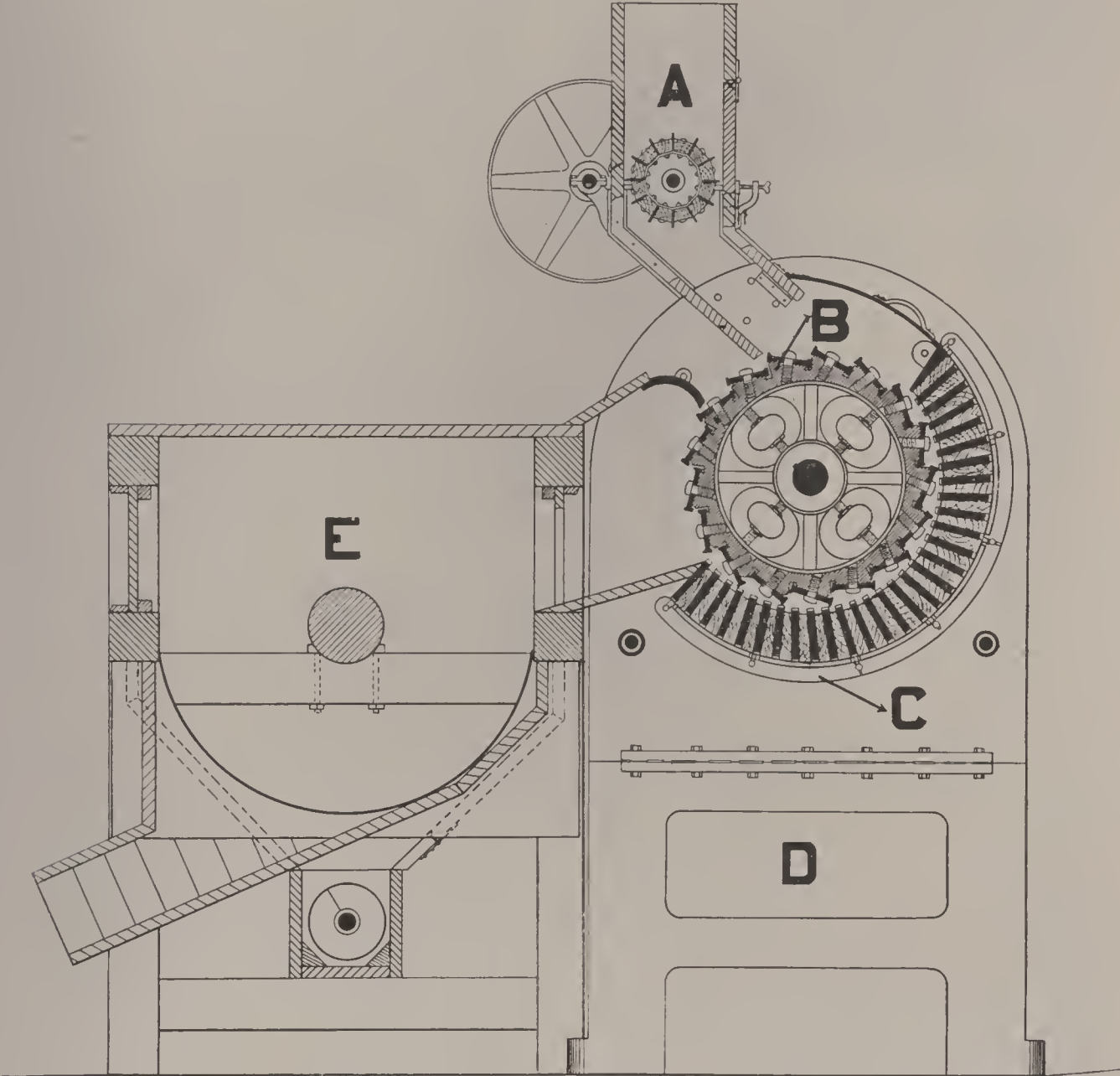


Figure 422.

Section through Separator, Huller and Feeder.

HULLER FEEDER.

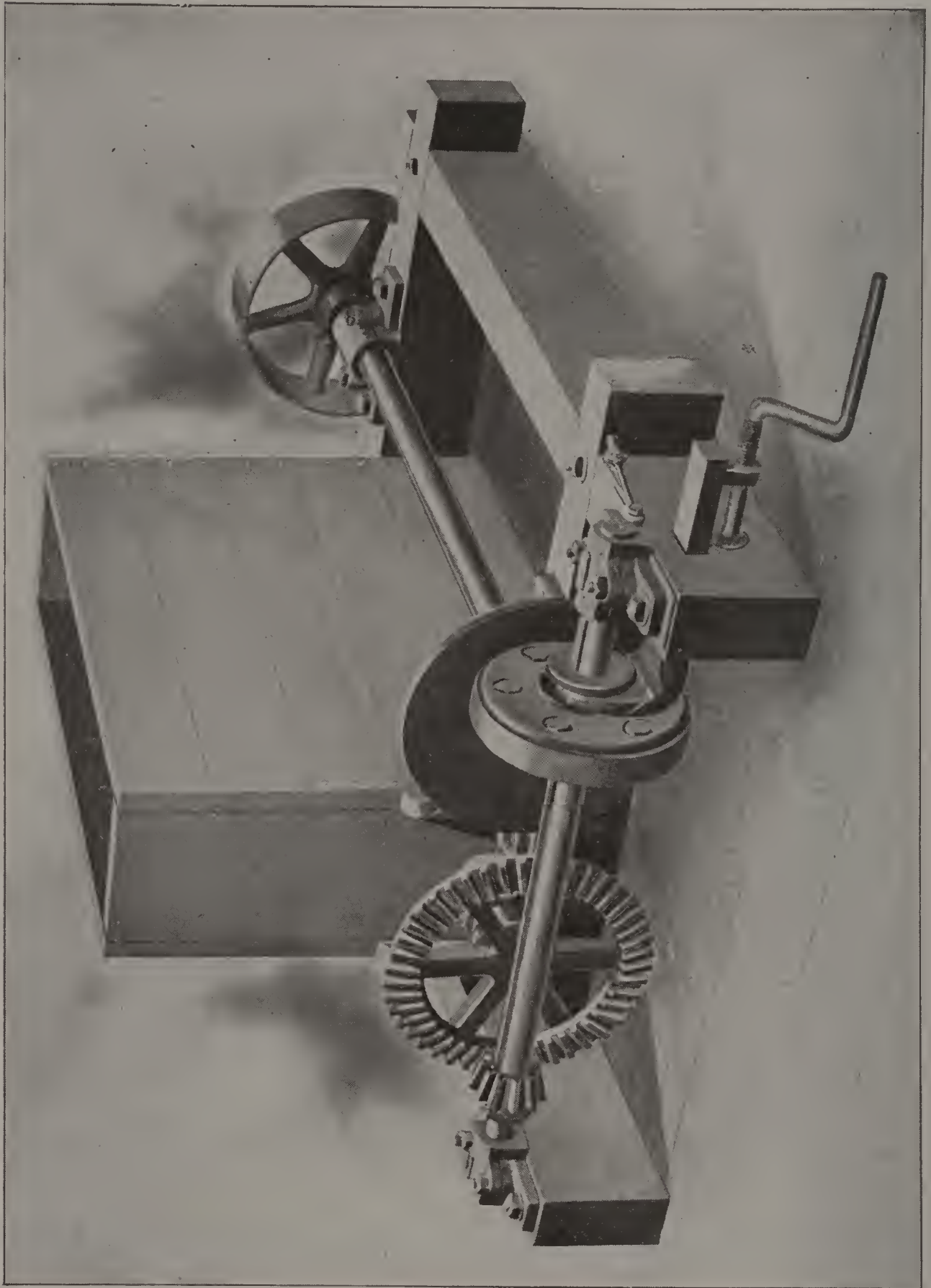


Figure 423.

Made in our shops.

For price see page 300.

PLANTATION HULLER AND SEPARATOR.



Figure 424.
Small Plantation Cotton Seed Huller and Separator.

HULLER KNIFE GRINDERS.

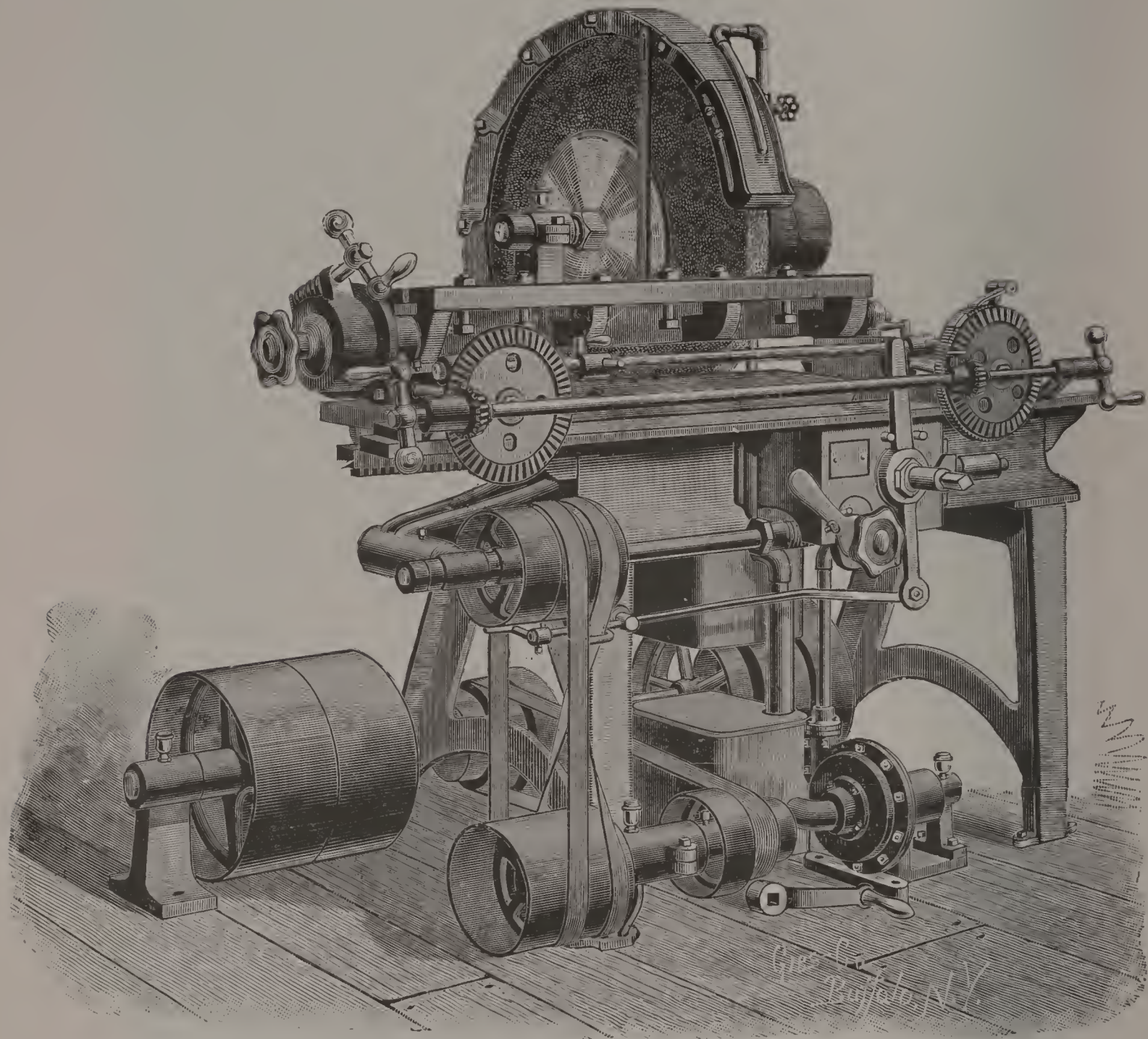


Figure 425.

PRICE LIST.

Huller Knife Grinder, entirely automatic, taking 40-inch knives . . .	\$225 00
Huller Knife Grinder, semi-automatic	175 00
WE ARE PREPARED TO GRIND HULLER KNIVES IN OUR SHOP.	

MEAT AND HULL SEPARATING SCREEN.

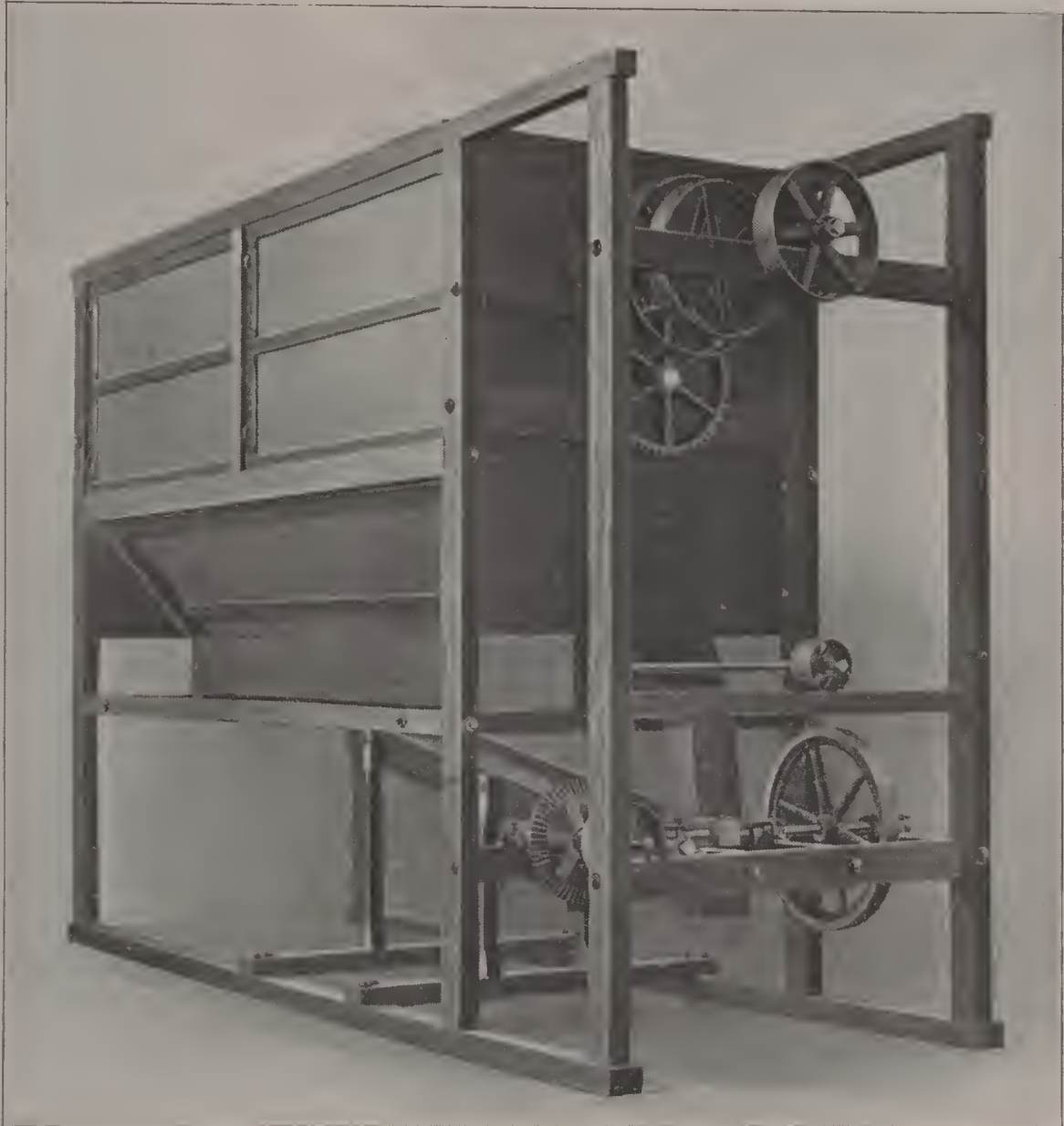


Figure 426.

Made in our shops.

This is similar in construction and appearance to the sand and boll screen. It is provided with a shaker underneath, to make the separation more perfect. It is self-contained, and is driven in the same manner as the sand and boll screen.

PRICE LIST.

Tompkins Separating Screens, with Shaker.

No. 1.	50 inches x 10 feet, 20 tons capacity		\$250 00
No. 2.	60 inches x 12 feet, 30 tons capacity		300 00
No. 3.	60 inches x 14 feet, 40 tons capacity		350 00
	For Beater, if desired, add		125 00

CRUSHER ROLLS.

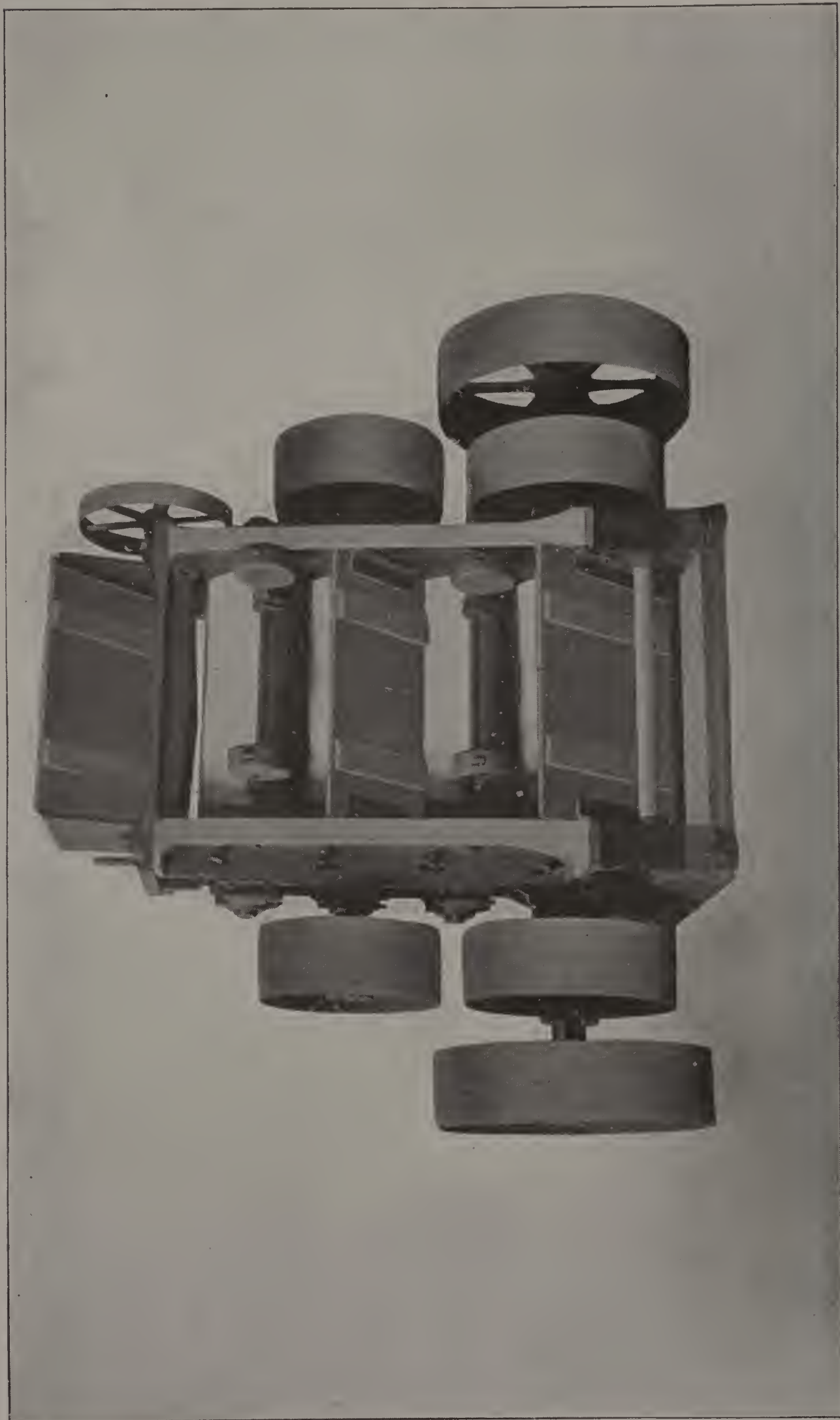


Figure 427.

Four-High Tandem Rolls.

For prices see page 311

CRUSHER ROLLS (Continued).

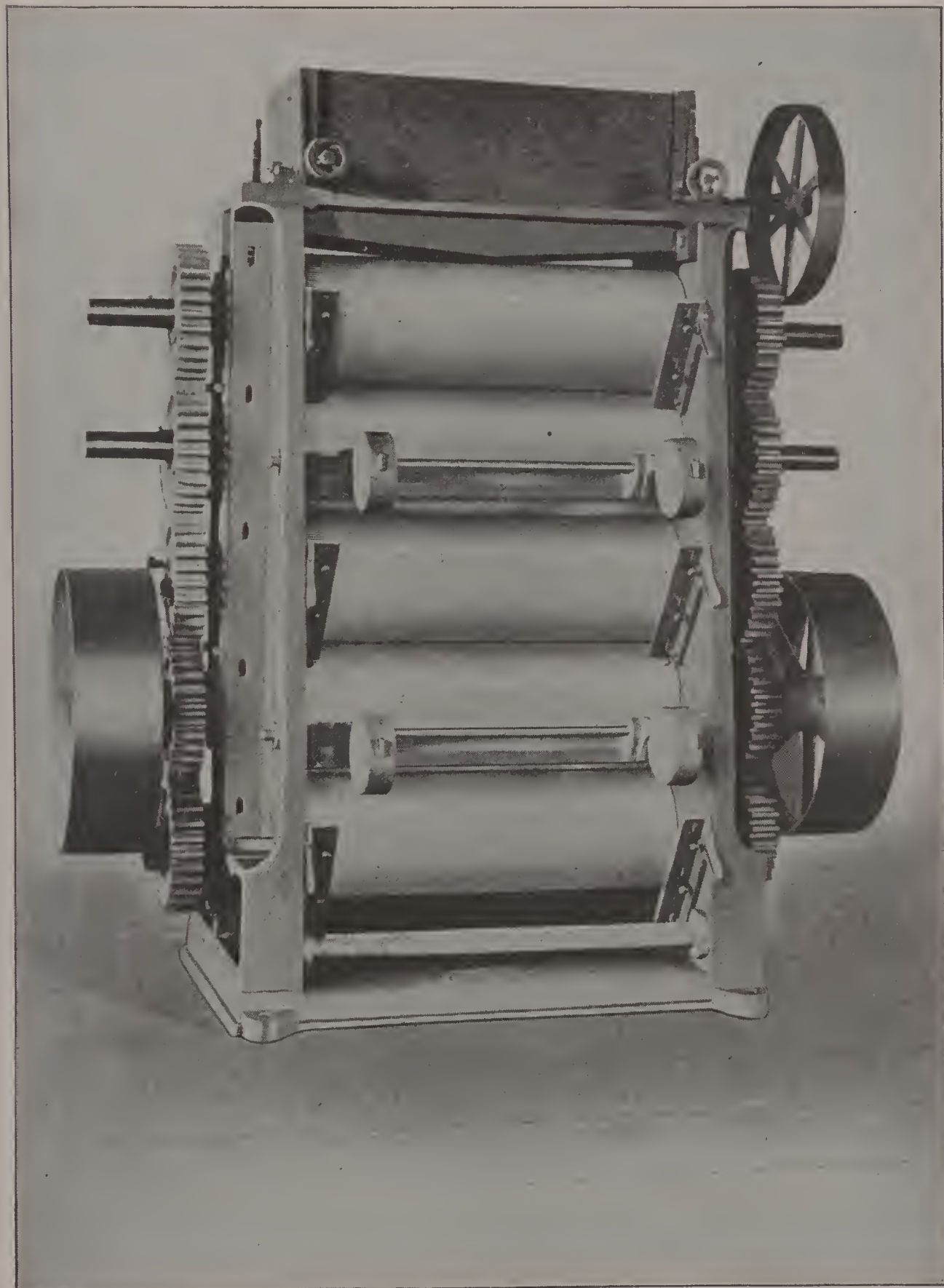


Figure 428.

Five-High Geared Rolls.

For prices see page 311.

CRUSHER ROLLS. (Continued).

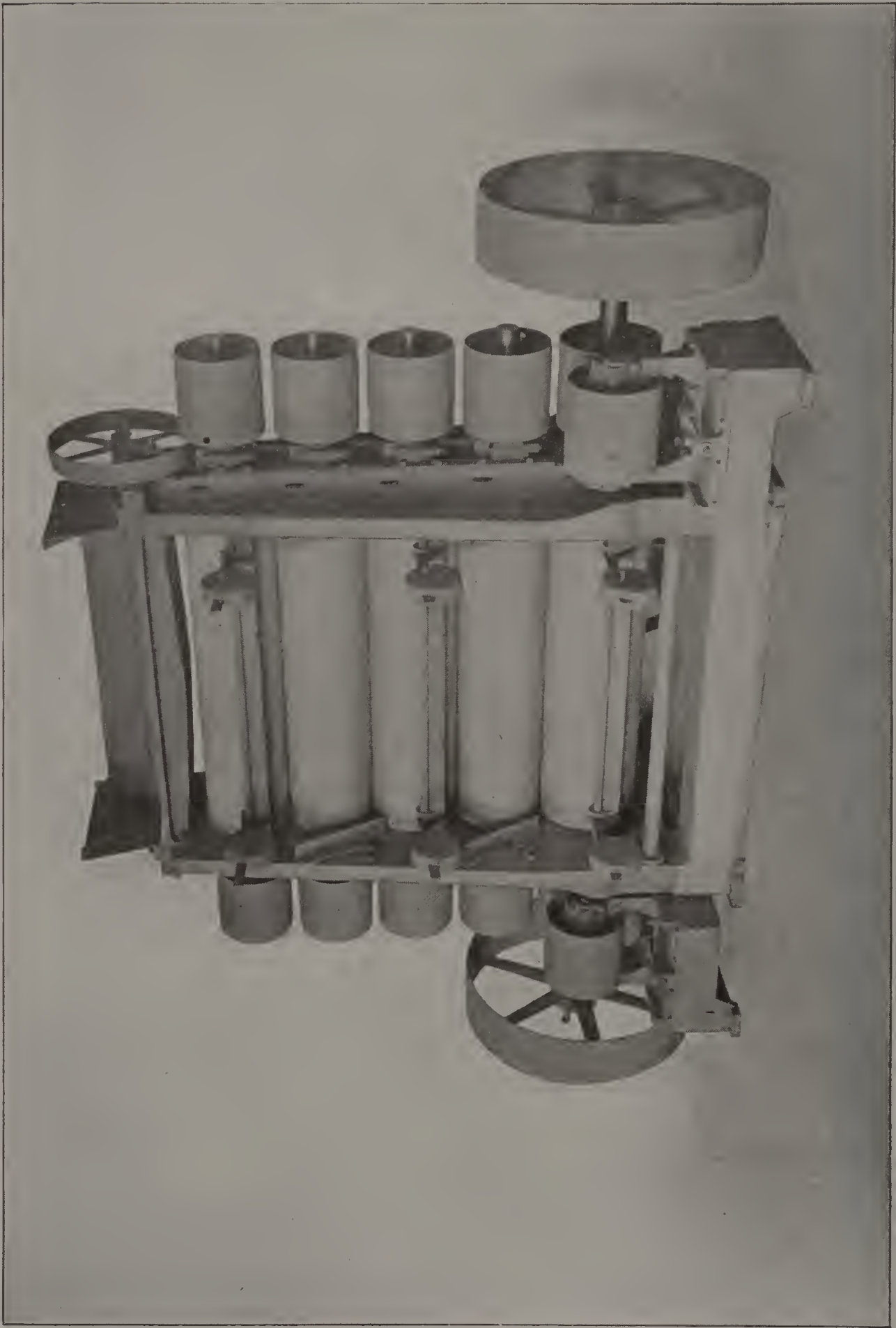


Figure 429.
Five-High Serpentine Rolls.
For prices see page 311.

CRUSHER ROLLS.

PRICE LIST.

	Weight.	Price.
4-High x 24 inches, gear 1 side	10,100.....	\$800 00
5-High x 24 inches, gear 1 side	11,000.....	960 00
3-High x 24 inches, belt 1 side.....		750 00
4-High x 24 inches, belt 2 sides	10,000.....	820 00
5-High x 24 inches, belt 2 sides	10,900.....	1,000 00
4-High x 30 inches, gear 2 sides	12,050.....	940 00
5-High x 30 inches, gear 2 sides	14,172.....	1,120 00
4-High x 30 inches, belt 2 sides	11,570.....	950 00
5-High x 30 inches, belt 2 sides	13,670.....	1,100 00
4-High x 36 inches, gear 2 sides	13,120	1,020 00
5-High x 36 inches, gear 2 sides	15,500.....	1,225 00
4-High x 36 inches, belt 2 sides	11,620.....	1,025 00
5-High x 36 inches, belt 2 sides	15,000.....	1,210 00
4-High x 42 inches, gear 2 sides	15,480.....	1,100 00
5-High x 42 inches, gear 2 sides	18,100.....	1,320 00
4-High x 42 inches, belt 2 sides	14,080.....	1,110 00
5-High x 42 inches, belt 2 sides	17,710.....	1,310 00
4-High x 48 inches, gear 2 sides	15,600.....	1,175 00
5-High x 48 inches, gear 2 sides	18,470.....	1,425 00
4-High x 48 inches, belt 2 sides	15,170.....	1,190 00
5-High x 48 inches, belt 2 sides	18,090.....	1,420 00
4-High x 60 inches, gear 2 sides	18,040.....	1,350 00
5-High x 60 inches, gear 2 sides	21,380.....	1,625 00
4-High x 60 inches, belt 2 sides	17,680.....	1,365 00
5-High x 60 inches, belt 2 sides	21,110.....	1,635 00
5-High x 30 inches, serpentine	13,870.....	1,150 00
5-High x 36 inches, serpentine	15,200.....	1,260 00
5-High x 42 inches, serpentine	18,010.....	1,360 00
5-High x 48 inches, serpentine	18,390.....	1,460 00
5-High x 60 inches, serpentine	22,750.....	1,725 00

HEATERS.

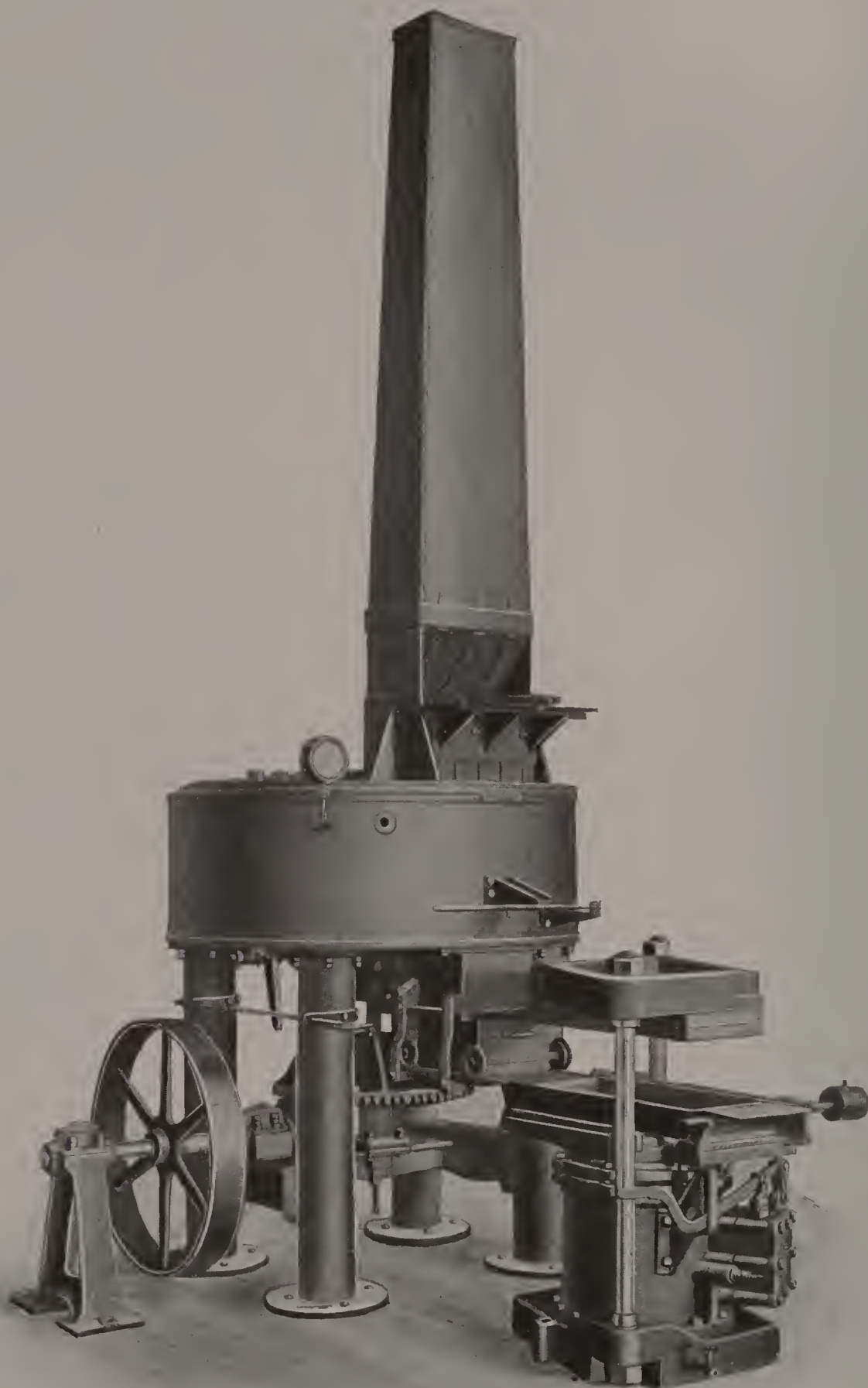


Figure 430.

52-inch Cooking Heater.

(Showing Hand-Carriage Former.)

For prices on Heaters see page 319.

HEATERS (Continued).

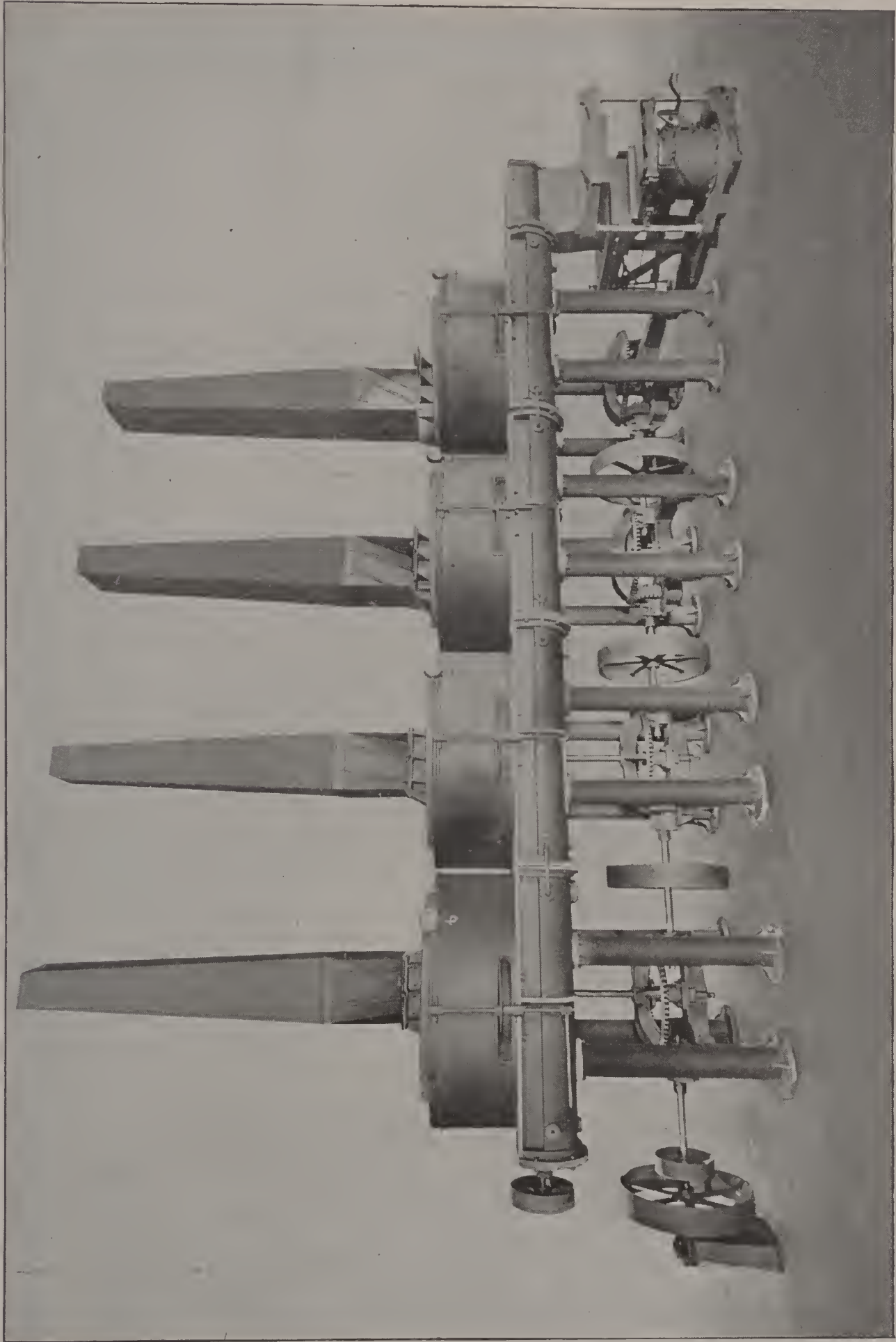


Figure 431.
Heaters with Independent Parallel Under Drive.
For prices on Heaters see page 319.

HEATERS (Continued).

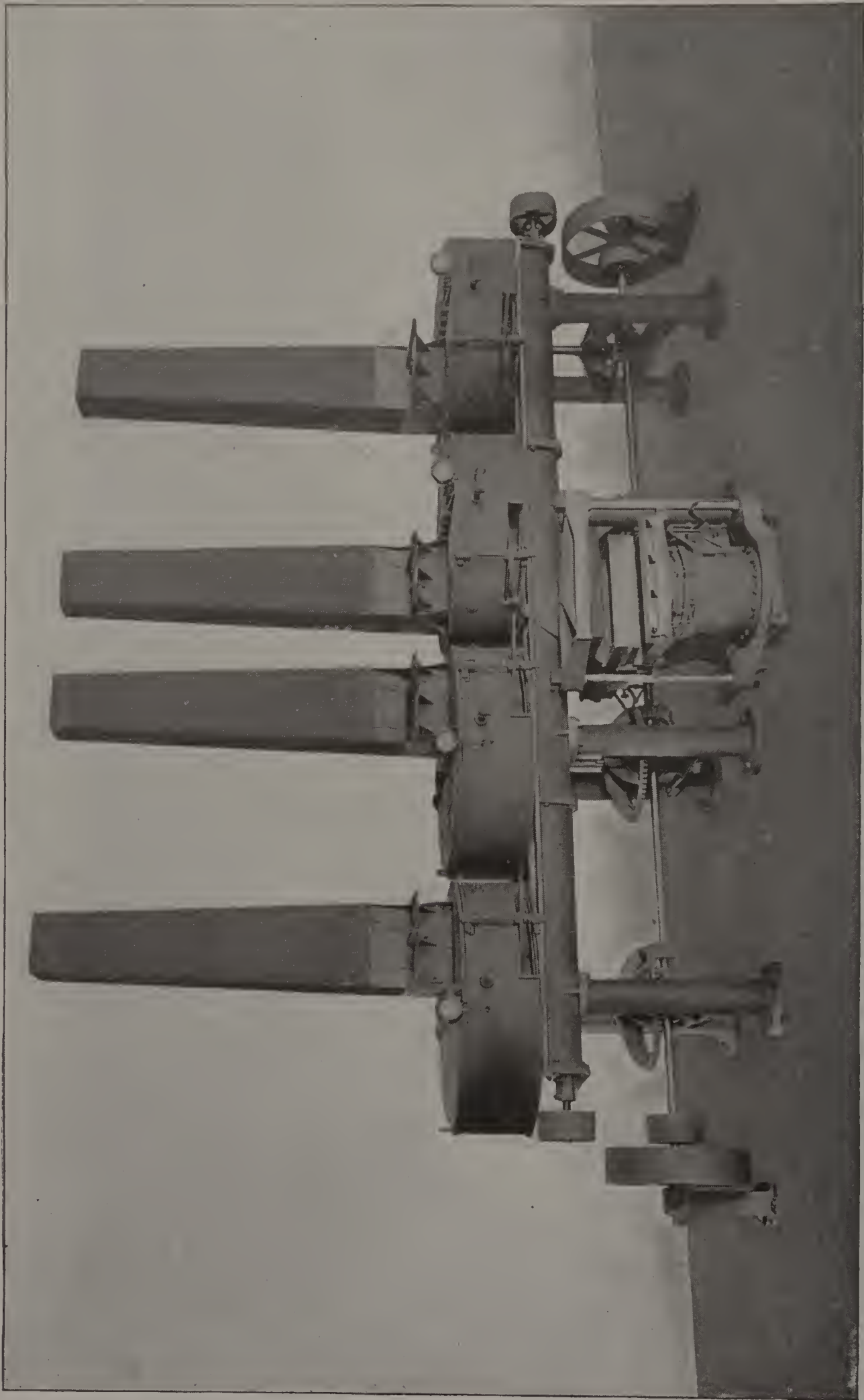


Figure 432.
Heaters with Gang Under Drive.
For prices on Heaters see page 319.

HEATERS (Continued).

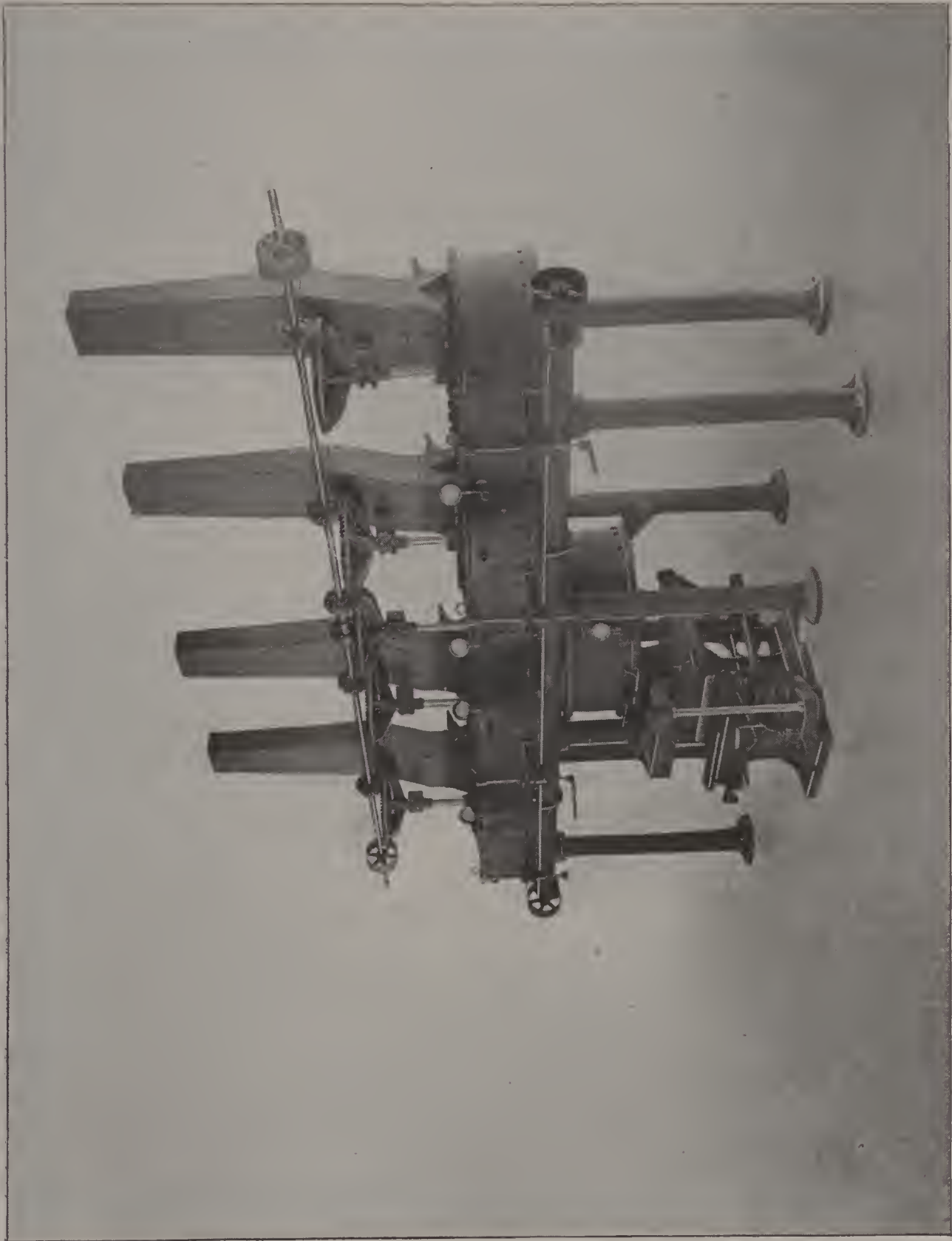


Figure 438.
Heaters with Overhead Drive.
For prices on Heaters see page 319.

HEATERS (Continued.)

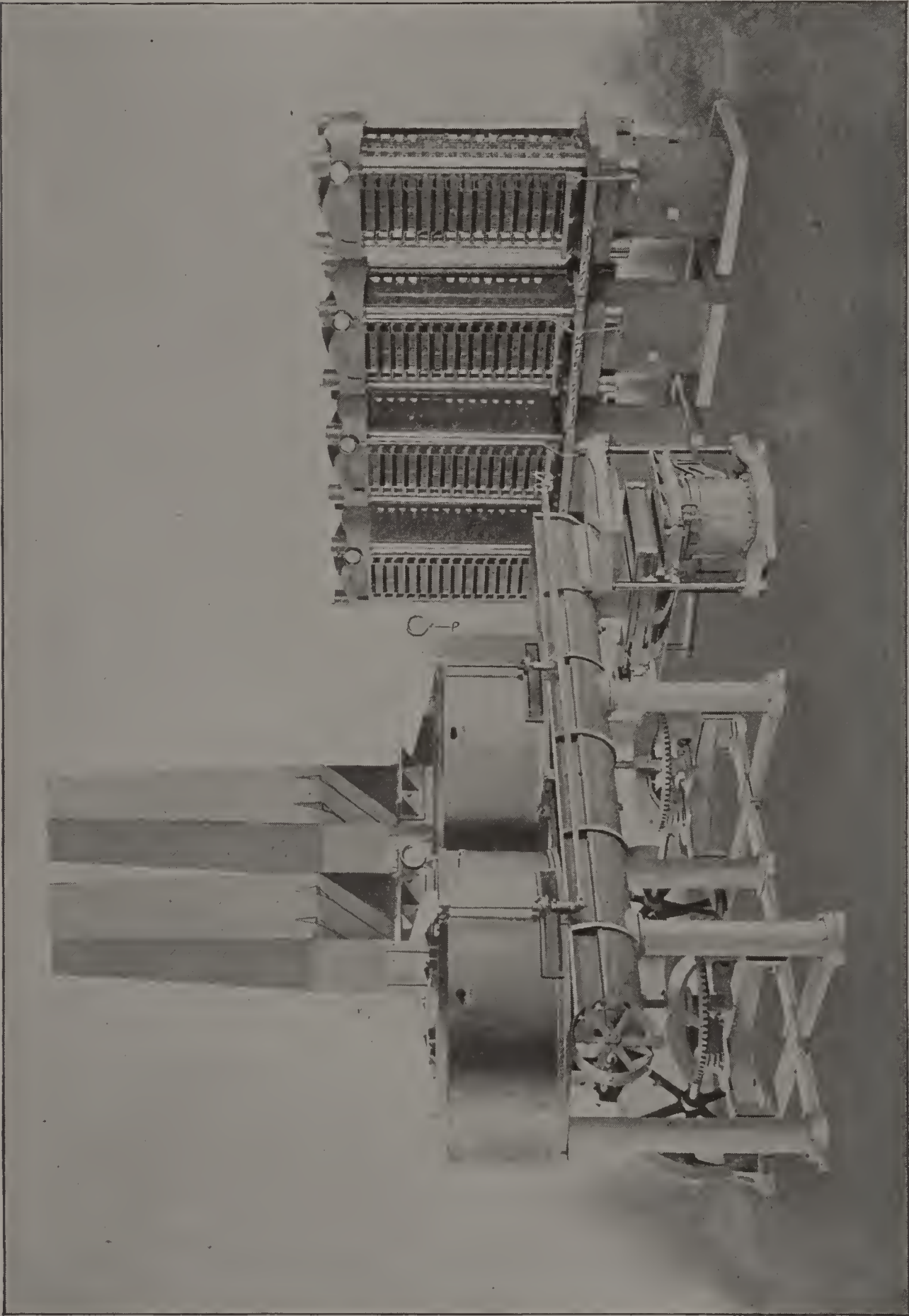


Figure 334.
Presses, Former and Heaters with Independent Right Angle Drive.
For prices on Heaters see page 319.

HEATERS (Continued.)

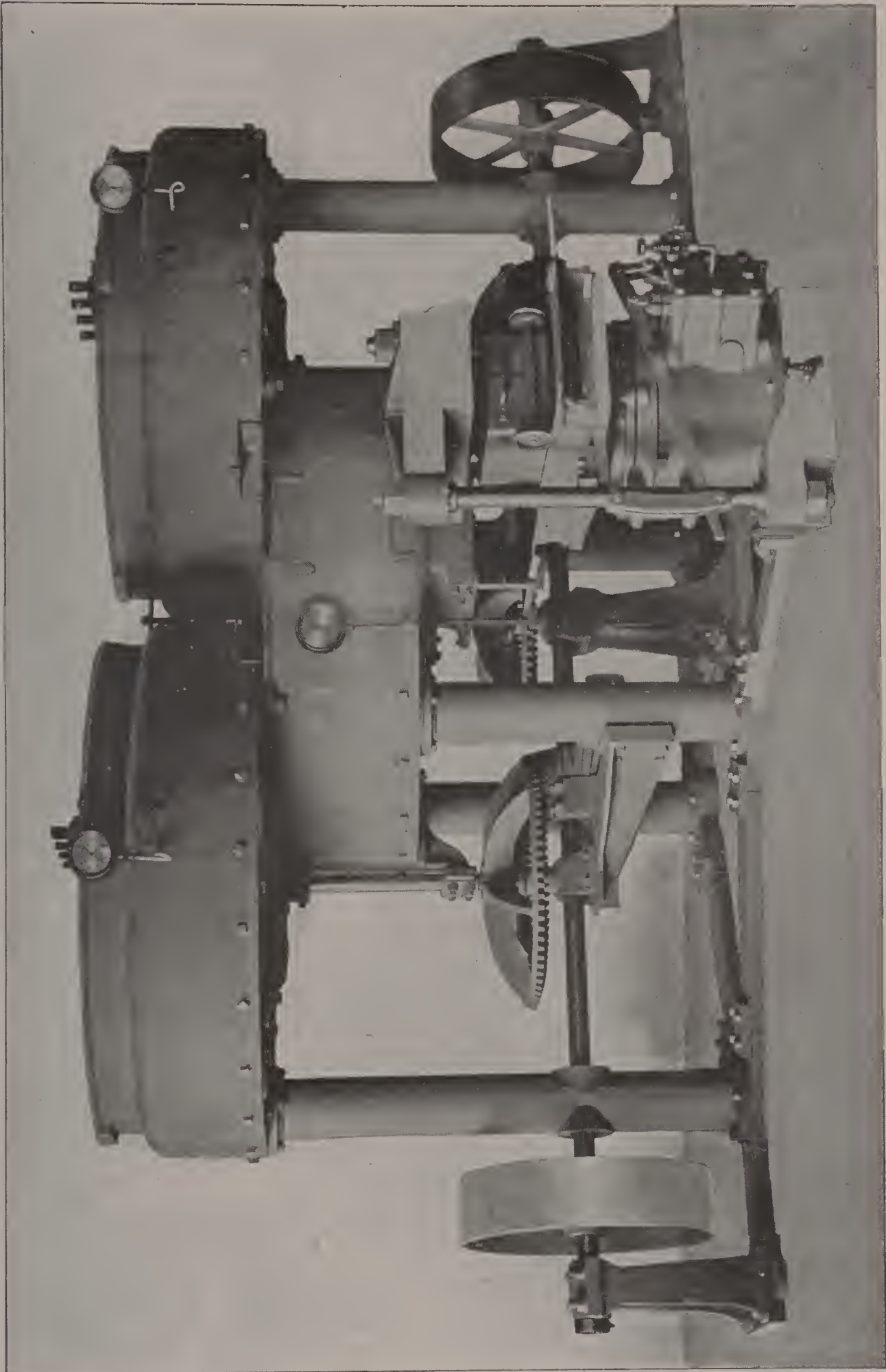


Figure 435.
Triple Heaters.
For prices see page 319.

HEATERS (Continued).

TRIPLE HEATER—LETTERING.

A.—Charging hoppers to hold a measured quantity of meats while waiting to be dumped into heaters.

B.—Cooking heaters.

C.—Conical head to carry stirrer arms.

D.—Stirrer arms.

E.—Space for steam to make the heat.

F.—Vertical stirrer shaft.

G. Storage or sub-heater, to keep meats warm while waiting to be used.

H.—Horizontal driving shaft.

J.—Lid partly open to temper the cooking.

K.—Gate to dump charging hopper.

L.—Lever to operate charging gate.

M.—Former to make cakes for presses.

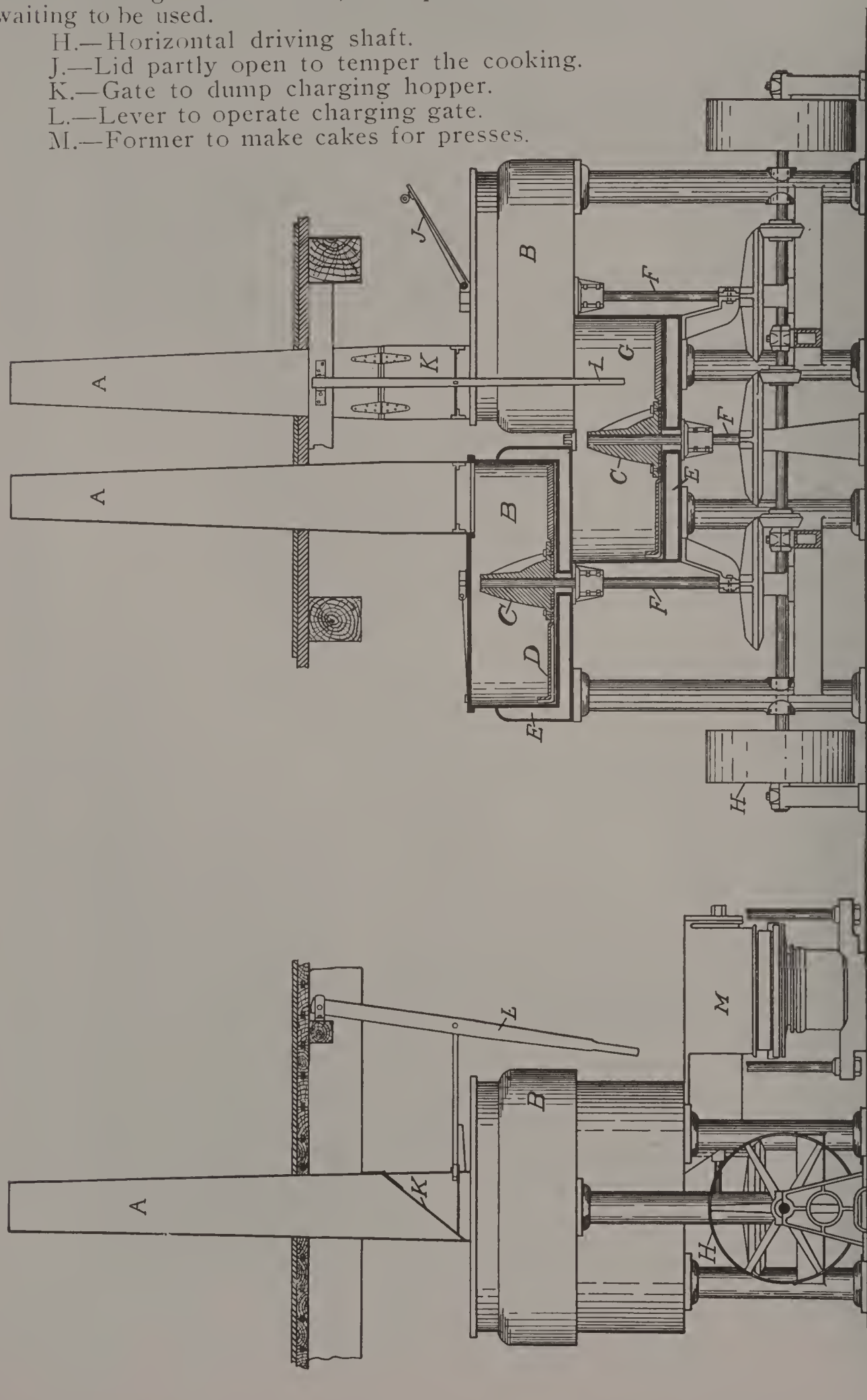


Figure 436.

Section Through Triple Heaters.

COOKING HEATERS.

The illustrations, Figs. 430 to 435 show the different methods of driving the various arrangements of these Heaters. We have two sizes: 52-inch and 72-inch. Our Heaters are of solid cast iron, without seams. The steam jacket is cast with the Heater body. The entire outside is jacketed with felt and finished up with Russia iron covering. They are provided with charging hoppers and easy working charging gates.

PRICE LIST.

	Weight, lbs.	Price.
52-inch Single Heater Complete, Bottom Drive . . .	8,600 .	\$ 600 00
Set of two 52-inch Heaters Complete, Bottom Drive .	16,000 .	1,050 00
Same, arranged for Top Drive	14,200 .	975 00
Double Deck 52-inch Heater, Bottom Drive	13,600 .	900 00
Same, arranged for Top Drive	13,400 .	850 00
Triple Set of two 52-inch Cookers and one Storage		
Heater, Bottom Drive	21,700 .	1,500 00
Same, arranged for Top Drive	19,800 .	1,375 00
Set of two 72-inch Heaters Complete, Bottom Drive .	22,500 .	1,450 00
Same arranged for Top Drive	19,000 .	1,275 00
Double Deck 72-inch Heater, Bottom Drive	18,000 .	1,175 00
Same arranged for Top Drive	17,600 .	1,150 00
Triple Set of two 72-inch Cookers and one Storage		
Heater, Bottom Drive	29,000 .	1,800 00
Same, arranged for Top Drive	25,500 .	1,650 00



NO. 1 PRESSURE REGULATOR.

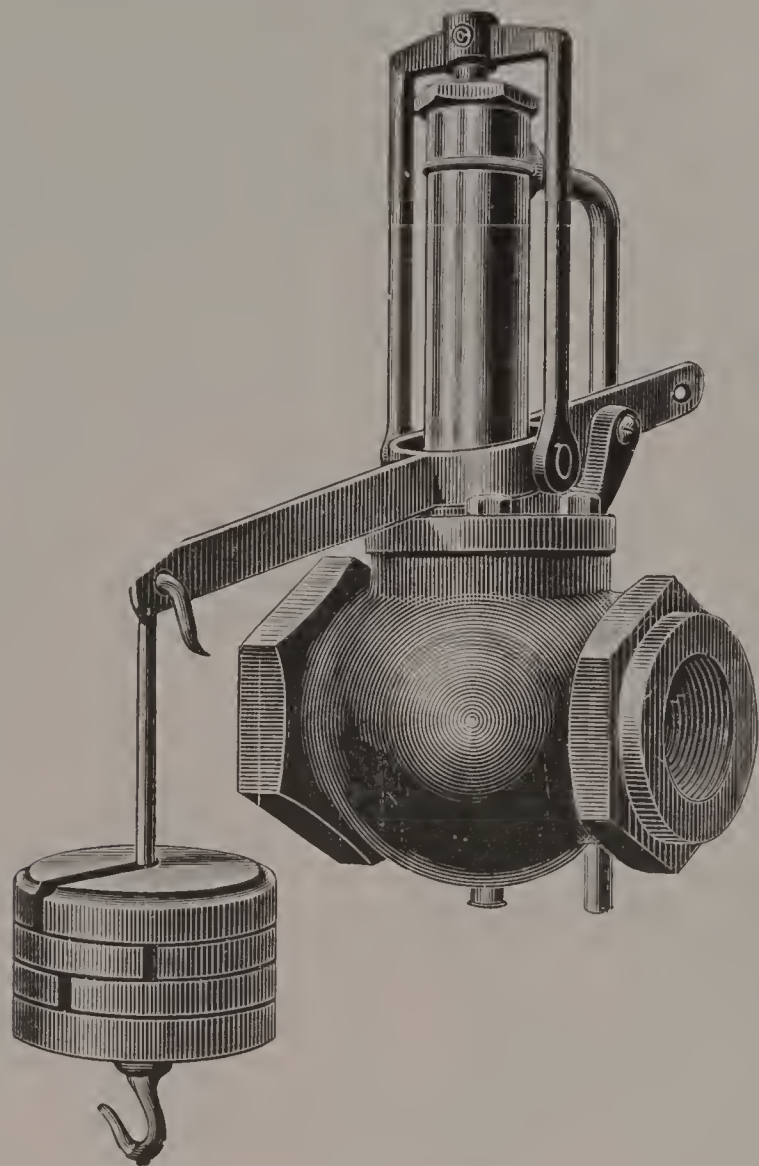


Figure 487.

This style is designed for all places where there is no pulsation of pressure. Suitable for Steam Heating, Boiling, Drying, Distilling, and all places requiring a constant, unvarying pressure below that of boiler.

In ordering, please state purpose for which valve is to be used, also pressure to be carried.

This style sent unless otherwise ordered.

PRICE LIST NO. 1 PRESSURE REGULATOR.

Size, Inches.	¾	1	1¼	1½	2	2½	3	3½	4	5	6	7	8	10	12	15
Price, Each.....	\$ 20	\$ 22	\$ 24	\$ 25	\$ 30	\$ 35	\$ 40	\$ 50	\$ 60	\$ 75	\$100	\$135	\$175	\$275	\$400	\$500
Length Screw-End Valves, Inches....	3¼	4	5	7	7½	7½	9½	9½	10½	11½	12½					
Length Flanged Valves, Inches....					7½	7½	9½	9½	10½	11½	12½	13½	16	20	21	24½
Diameter of Flanges, Inches...					6	7	7½	8½	9	10	11	12½	13½	16	19	22

¾ to 1½ inch inclusive, Screw end; 2, 2½, 3, 4, 5 and 6 inch, either Flanged or Screw End. 7 to 15 inch, Flanged End.

For very low pressure such as Vacuum System of Steam Heating, order Valve No. 3.

FORMER.

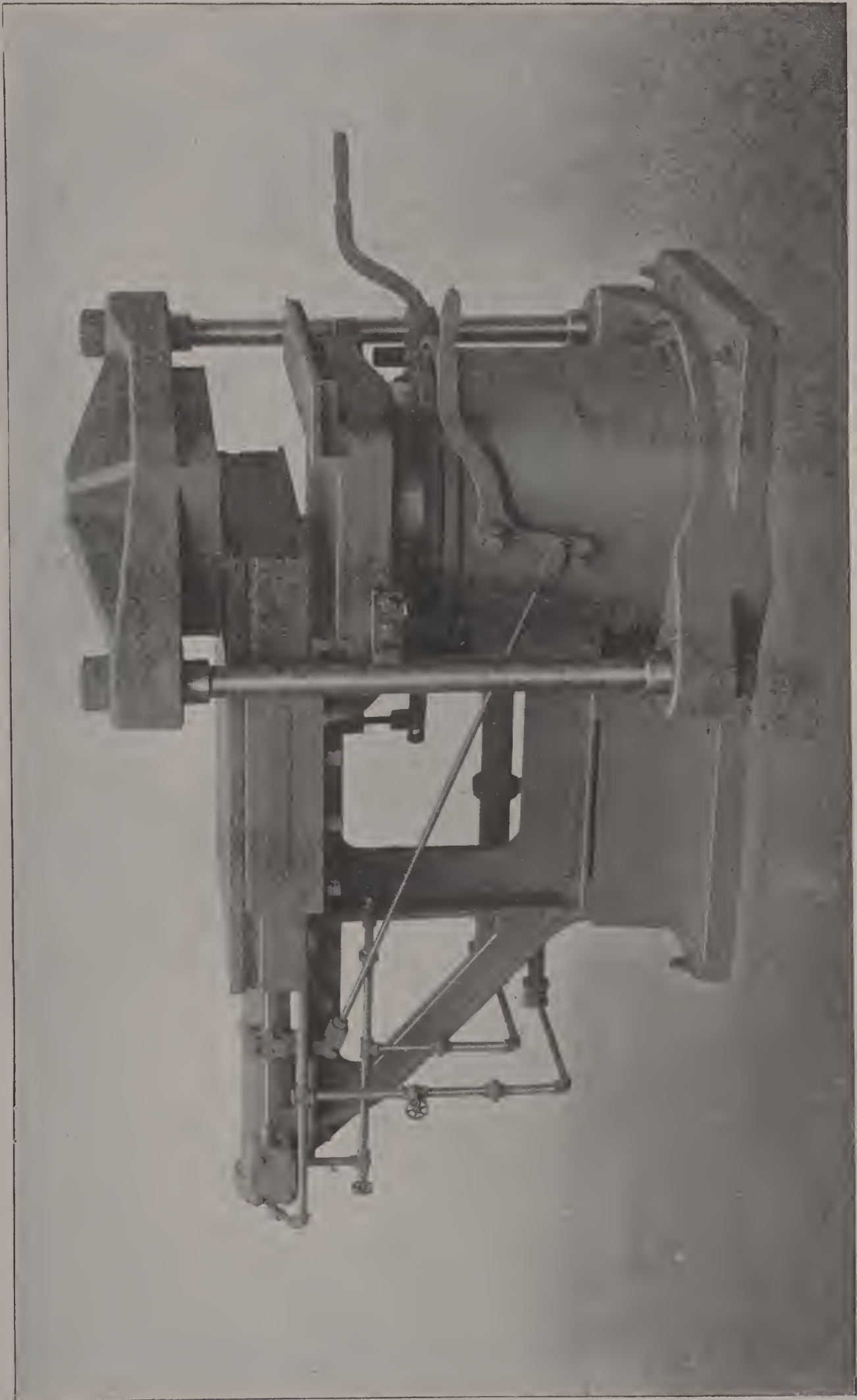


Figure 438.
Improved Steam Cake Former.
(Vaile and Tompkins Patent.)

The illustration shows the self-acting steam carriage style. This has a separate direct acting steam cylinder to operate the carriage which distributes the meats in the Former bed. We also furnish Formers with hand carriage when desired.

PRICE LIST, CAKE FORMERS.

Weight, lbs. Price.		Weight, lbs. Price.	
No. 1. Steam Carriage Former	. 7,100 \$850 00	No. 2. Hand Carriage Former	. 4,900 \$500 00

OIL PRESSES.

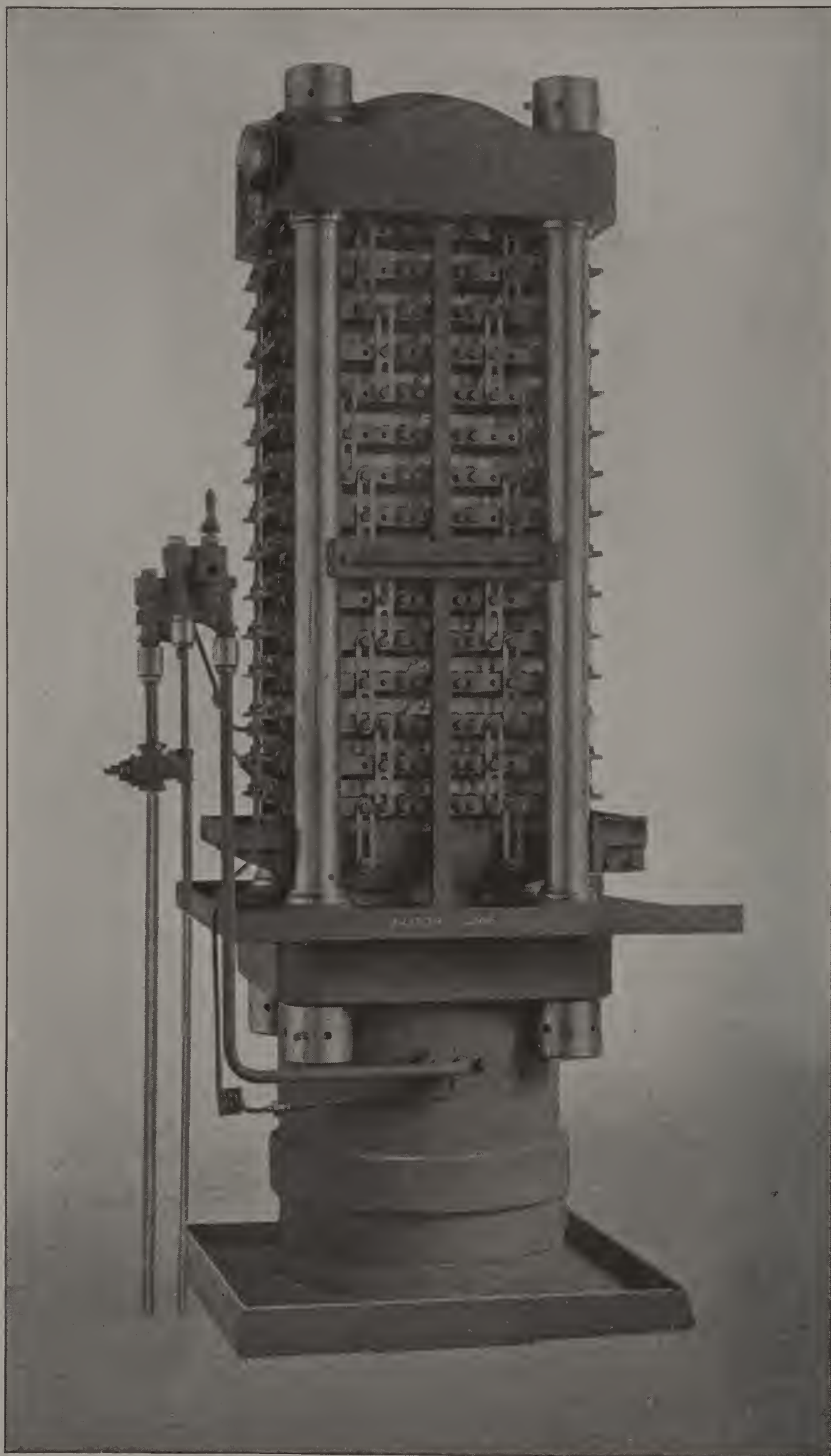


Figure 439.

15-Plate Hydraulic Oil Press. For prices see page 326.

OIL PRESSES (Continued).

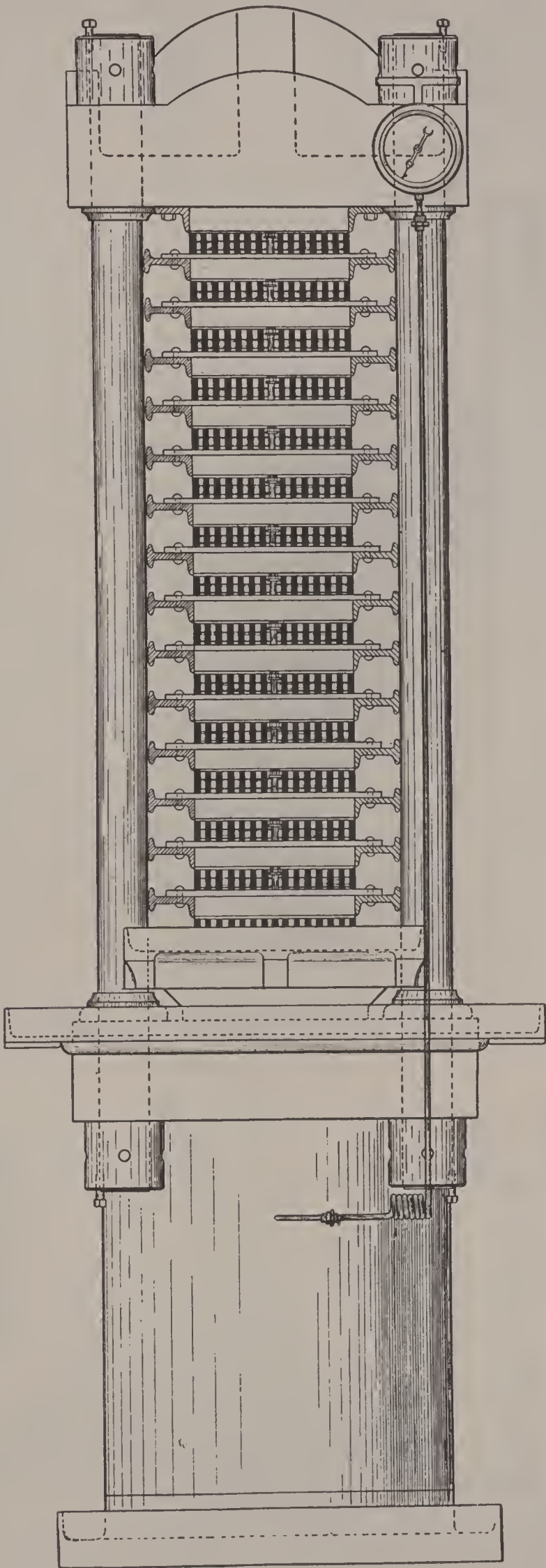


Figure 440.
Oil Press in Section.

OIL PRESSES (Continued).

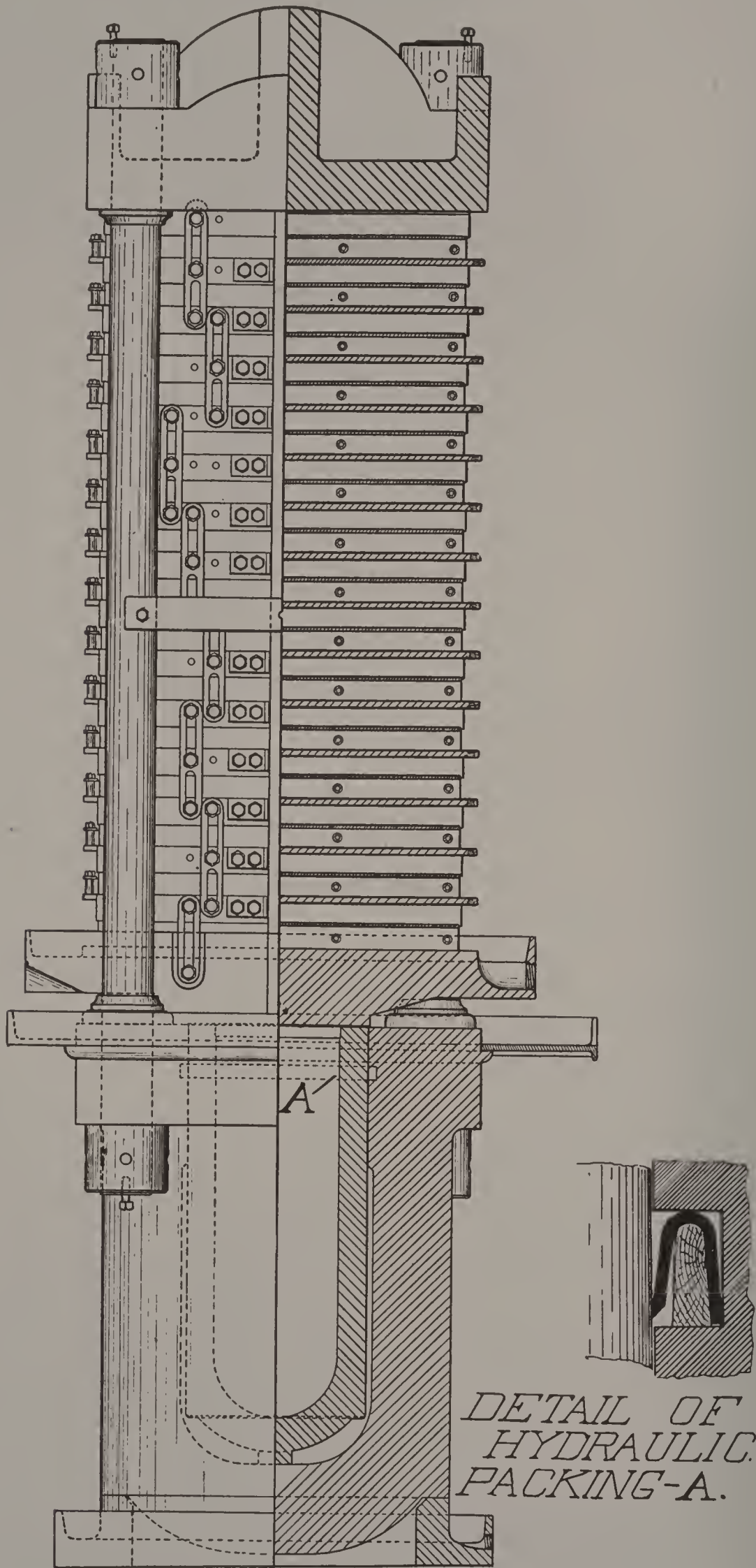


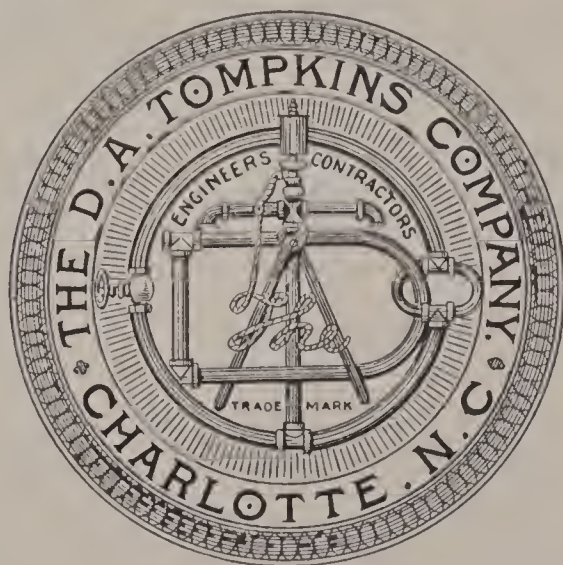
Figure 441.

Oil Press, Showing Hydraulic Packing.

HYDRAULIC PACKING FOR OIL PRESS.

It is necessary to have a special packing to make the joint between the ram and the cylinder. Figure 441 shows the cylinder in section. The packing is shown at A. It consists of a crimp made of sole leather, formed in a mould made for the purpose. Figure 442 shows one kind of crimp mould. The leather used should be hard and sound. It is better to have it planed to a uniform thickness. It is put into the mould when thoroughly wet, and kept until entirely dry and hard. It is then taken out and the center cut out, leaving a ring of the shape shown in figure 441. It is carefully trimmed to the correct size and wedged into the recess with blocks of hard wood, such as walnut or maple. Care must be taken to so mould the leather that the hair or grain side of the leather will come next to the ram, where the wear comes. A good packing should last several months; but sometimes, on account of unseen defects in the leather, it may fail in a single day. A mill should always keep on hand one or more packings, ready for emergencies.

The blocks for wedging in the packing should be carefully formed to exactly fill the space in the leather cup and hold it firmly in place. A good way to make the blocks is to build up a wood cylinder of straight staves, after the fashion of a barrel, 12 or 15 inches long. The staves are glued together and fastened endwise to the face plate of a lathe and turned inside and outside to the proper diameter. The end of cylinder is turned to the proper shape and a ring of the blocks cut off. These are then split apart, and are ready for use. Several sets may thus be made and cut off and kept for future use.



OIL PRESSES (Continued).

See Fig. 439

These have steel plates with extra strong side walls, and with ample drainage capacity. We furnish brass plates on special orders. We furnish Presses with 12 plates, or with 15 plates as desired.

PRICE LIST.

12-Plate Press:	Weight.	Price.
One 12-Plate Press complete, with 1/4-inch steel perforated plates, hydraulic gauge and gauge pipes, galvanized drain trough, and 3/4-inch change valve	20,860	\$1,400 00
The above, with perforated brass pans	21,050	1,450 00
The above, with perforated brass pans and brass top liners	21,190	1,610 00
15-Plate Press:		
15-Plate Press Complete, with 1/4-inch steel perforated plates, hydraulic gauge and gauge pipes, galvanized drain trough and 1-in. change valve	22,900	1,550 00
The above with perforated brass pans	23,100	1,600 00
The above with perforated brass pans and brass top liners	23,300	1,710 00

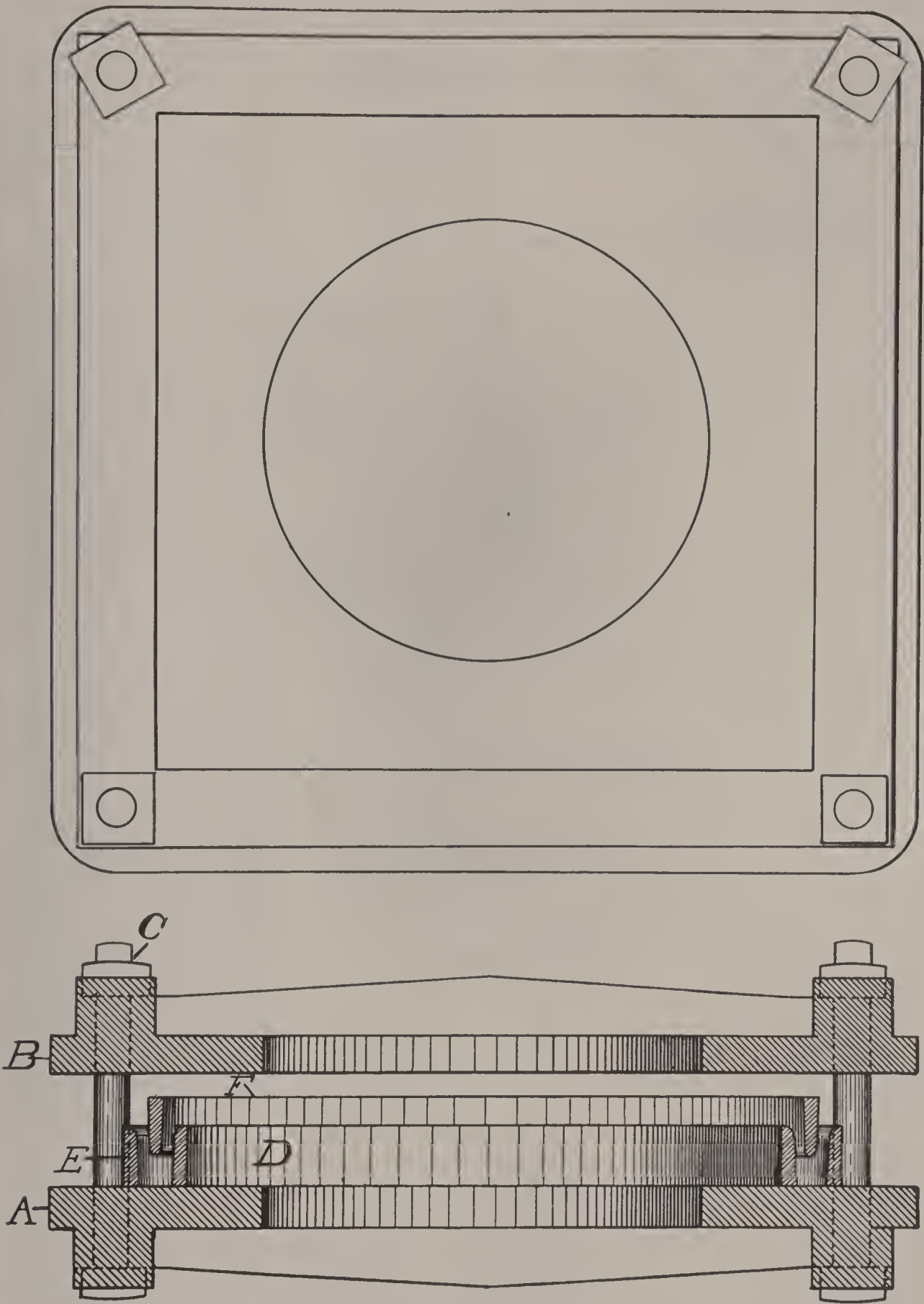


Figure 442.

Mould for Making Hydraulic Packing.

HYDRAULIC PUMPS

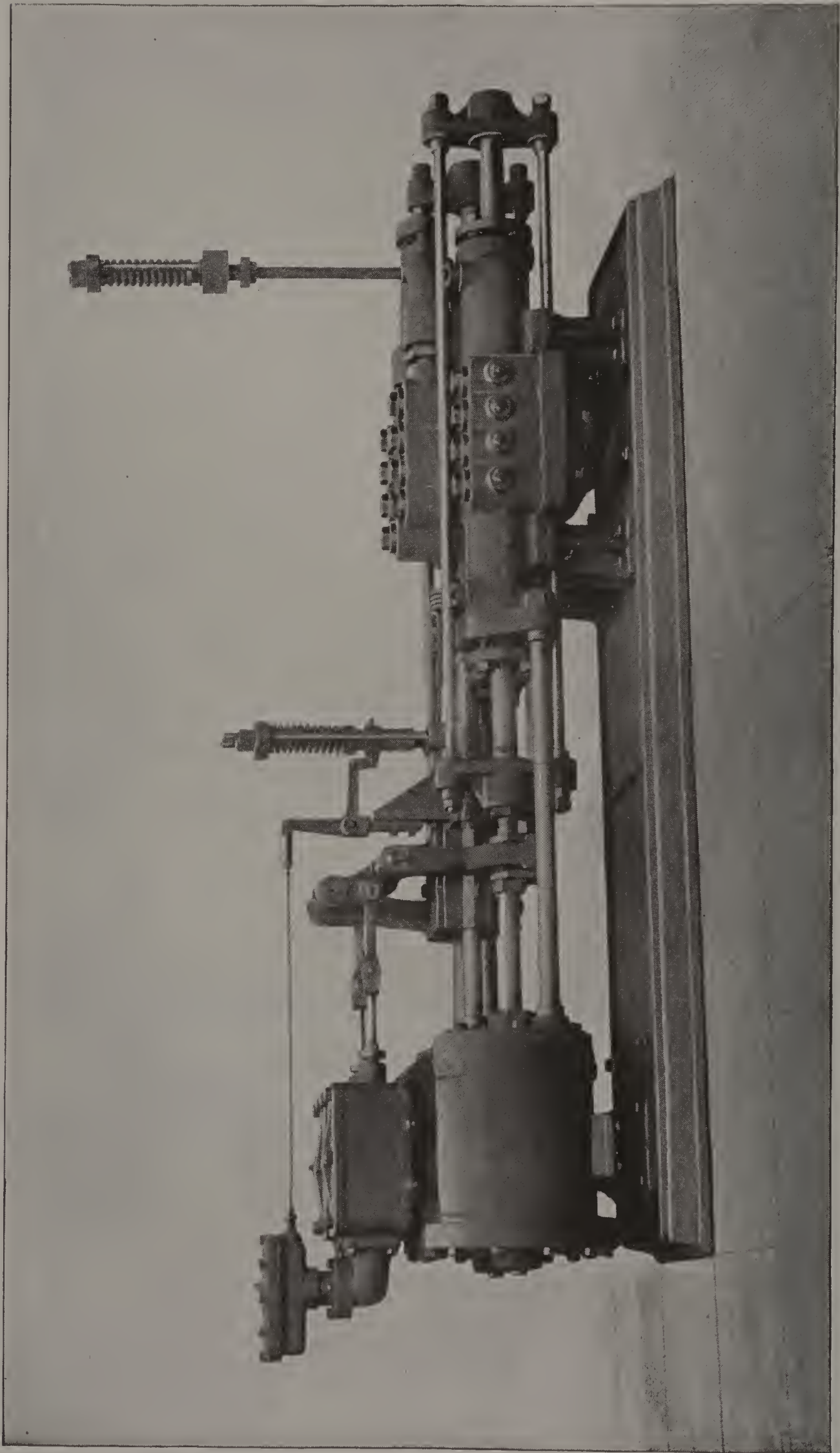


Figure 443.
Duplex Hydraulic Pressure Steam Pump.

HYDRAULIC PUMPS.

Figure 443.

We furnish all sizes and styles of Hydraulic Pumps, both belt driven and independent steam driven, such as shown in the illustrations. They are made for low pressure or for high pressure as desired. They all have automatic and positive pressure regulators.

PRICE LIST, DUPLEX HYDRAULIC PUMPS.

Size.	Price.	Weight.	Governor and Safety Valve.
6 x 3¼ x 6	291 50	1950	100 00
6 x 11⁄8 x 6	291 50	1950	100 00
6 x 1½ x 6	291 50	1950	100 00
7 x 7⁄8 x 10	470 00	3450	100 00
7 x 1¼ x 10	485 00	3525	100 00
7 x 1½ x 10	485 00	3525	100 00
7 x 1¾ x 10	485 00	3525	100 00
8 x 1 x 10	500 00	3575	100 00
8 x 1¾ x 10	500 00	3575	100 00
8 x 1¾ x 10	500 00	3575	100 00
8 x 2 x 10	565 00	4800	100 00
10 x 1¼ x 12	645 00	5675	100 00
10 x 1¾ x 12	655 00	5675	100 00
10 x 21⁄8 x 12	770 00	6675	100 00
10 x 2½ x 12	770 00	6675	100 00
12 x 1½ x 12	700 00	5975	125 00
12 x 2 x 12	815 00	6975	125 00
12 x 25⁄8 x 12	825 00	6975	125 00
12 x 3 x 12	890 00	7600	125 00
14 x 1¾ x 12	775 00	6475	125 00
14 x 2¼ x 12	900 00	7475	125 00
14 x 3 x 12	965 00	8100	125 00
14 x 3½ x 12	965 00	8100	125 00
16 x 2 x 12	925 00	7875	125 00
16 x 2¾ x 12	925 00	7875	125 00
16 x 3½ x 12	1000 00	8500	125 00
16 x 4 x 12	1125 00	9900	125 00

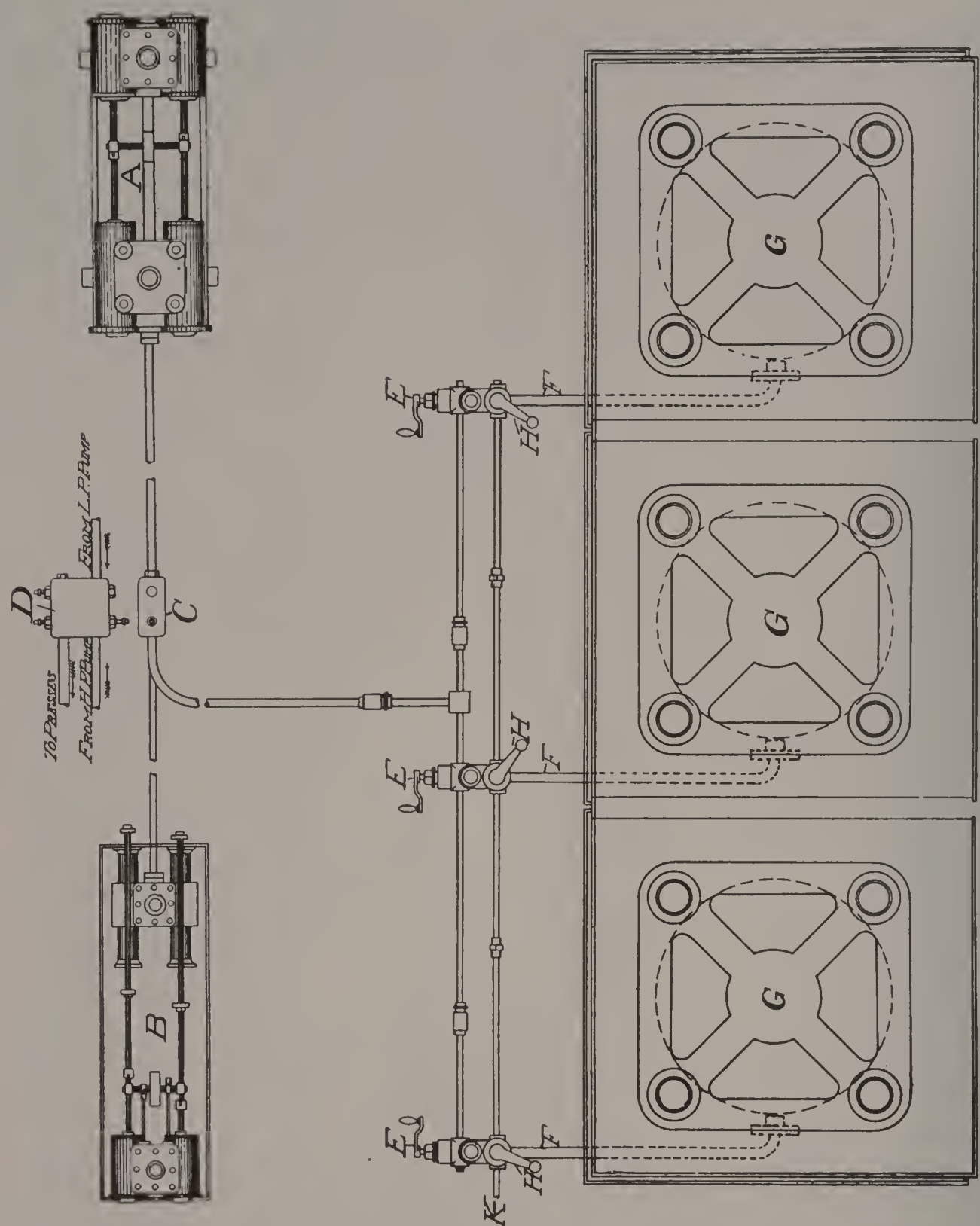


Figure 444.
Pump and Press Connections.

Fig. 444 shows a high and low pressure pump, piped up to three presses. More presses could be added if desired.

- A.—Low pressure pump.
- B.—High pressure pump.
- C.—Automatic change valve.
- D.—Side view of automatic change valve.
- E. H.—Press change valves.
- F.—Pipe to press.
- G.—Presses.
- K.—Discharge pipe to tank.

The automatic change valve C (see Fig. 446), is put near pumps. By this plan only one line of the pipes is required, to go from the automatic change valve to as many presses as one set of pumps will supply.

AUTOMATIC PRESS VALVES.

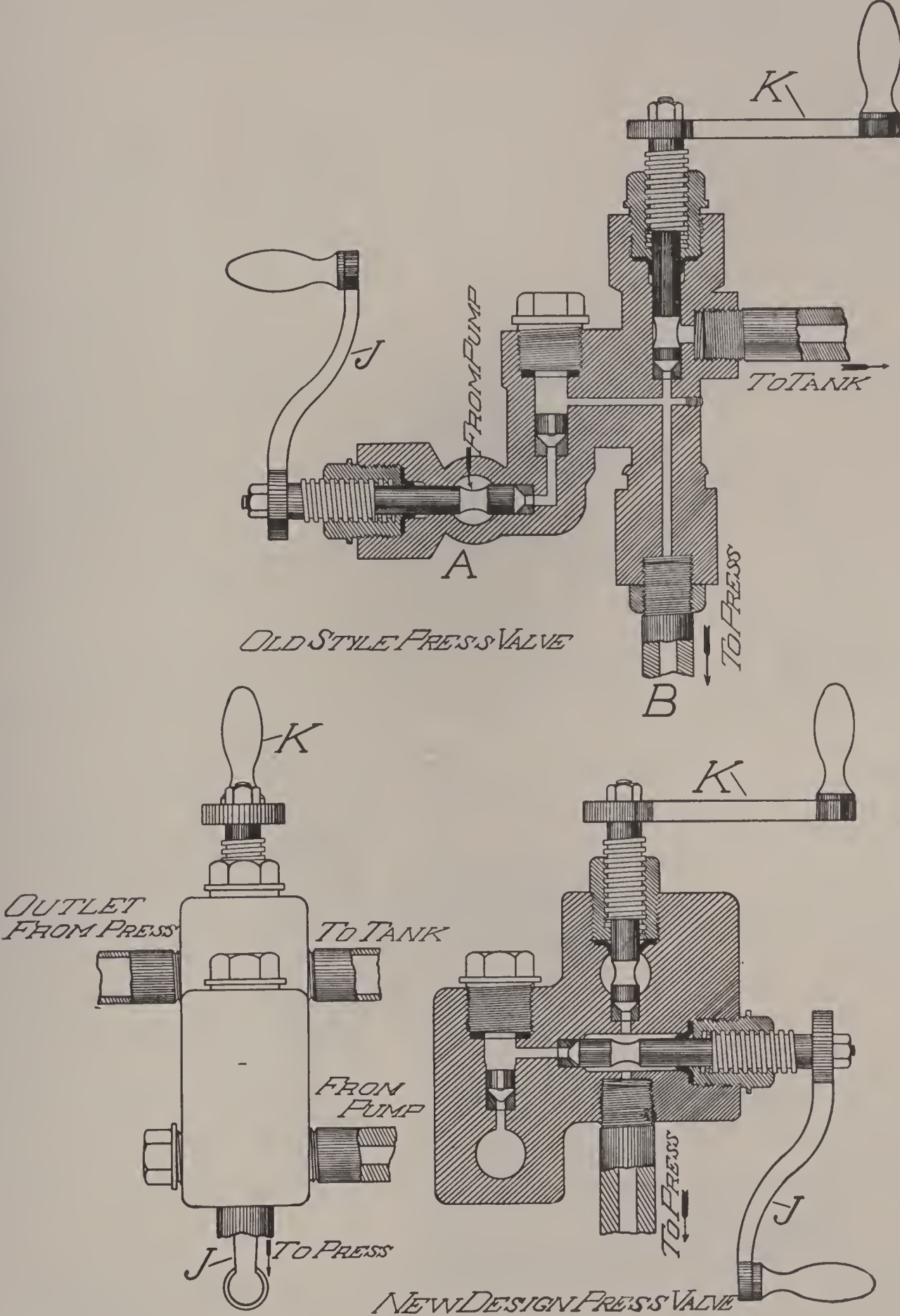


Figure 445.

Hydraulic Press Valves.

AUTOMATIC PRESS VALVES (Continued).

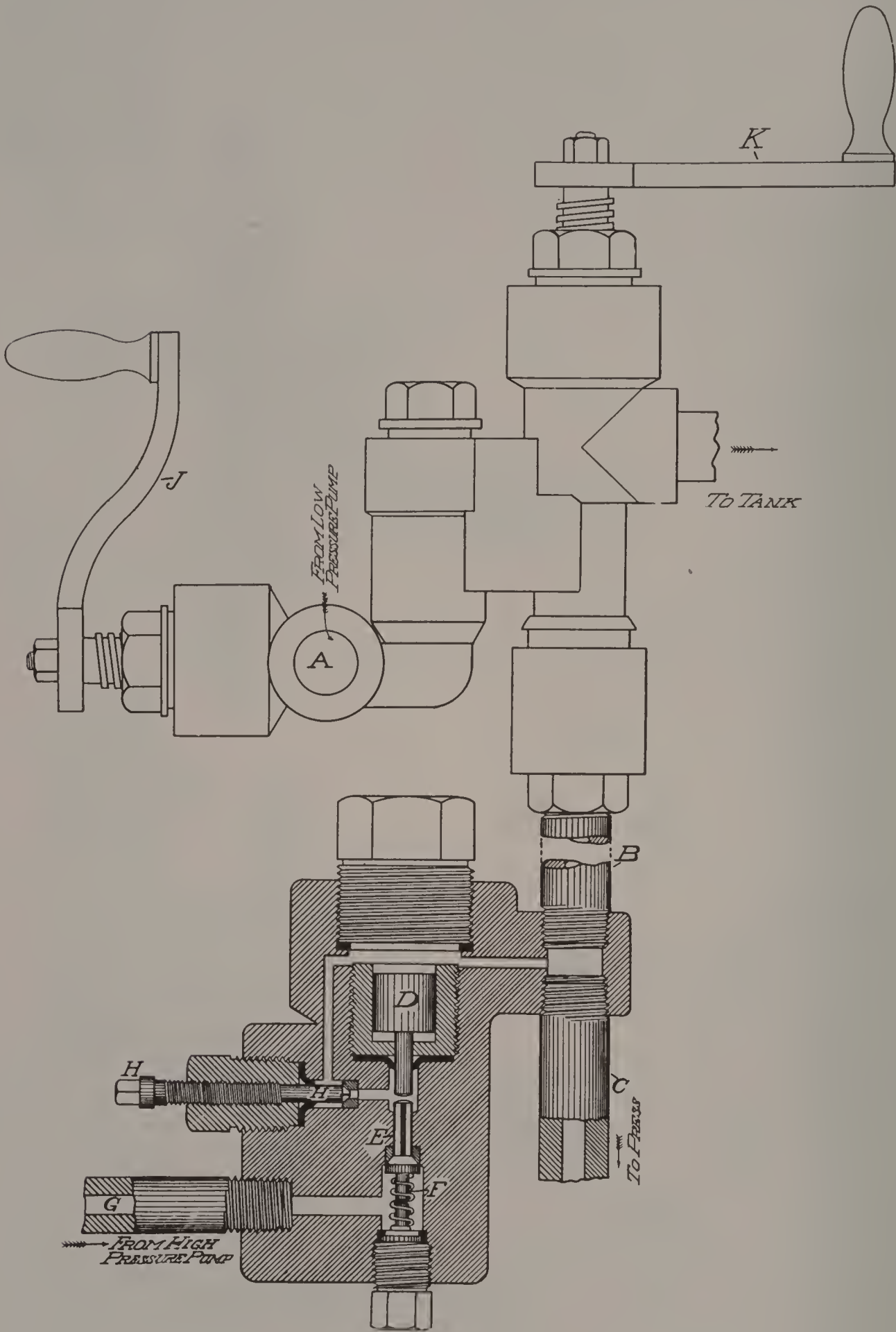


Figure 446.

Old Style Automatic Change Valve.

AUTOMATIC CHANGE VALVE.

In connection with this system of high and low pressures, with or without the accumulators, there was devised a system of automatic change valves to admit to the press the low pressure and automatically change over to the high pressure.

Sometimes the automatic valves were left out, and the changes made with the regular press valve, by a man watching the gauge.

Fig. 446 shows an automatic change valve in section, connected by piping to a regular press valve shown above. The connecting pipe is shown broken to indicate that the automatic valve may be placed in any desired position with reference to the press valve.

Low pressure pump is connected to the press valve at A. High pressure pump is connected to the automatic valve at G.

To put pressure on press, close K, open J.

Pressure is admitted from low pressure pump through A and adjacent check valve, through B and onward.

At 300 pounds pressure, plunger D is pressed down strongly enough to open E.

This admits high pressure through E, F, H, and onward.

High pressure shuts low pressure check valve and holds D down.

At H is a choke valve to admit the high pressure very gradually. This is to save press cloth and give the oil time to flow out of the meats in the press.

Valves similar to this are still in use, but some late valves are very much simplified in design.

AUTOMATIC CHANGE VALVES (Continued).

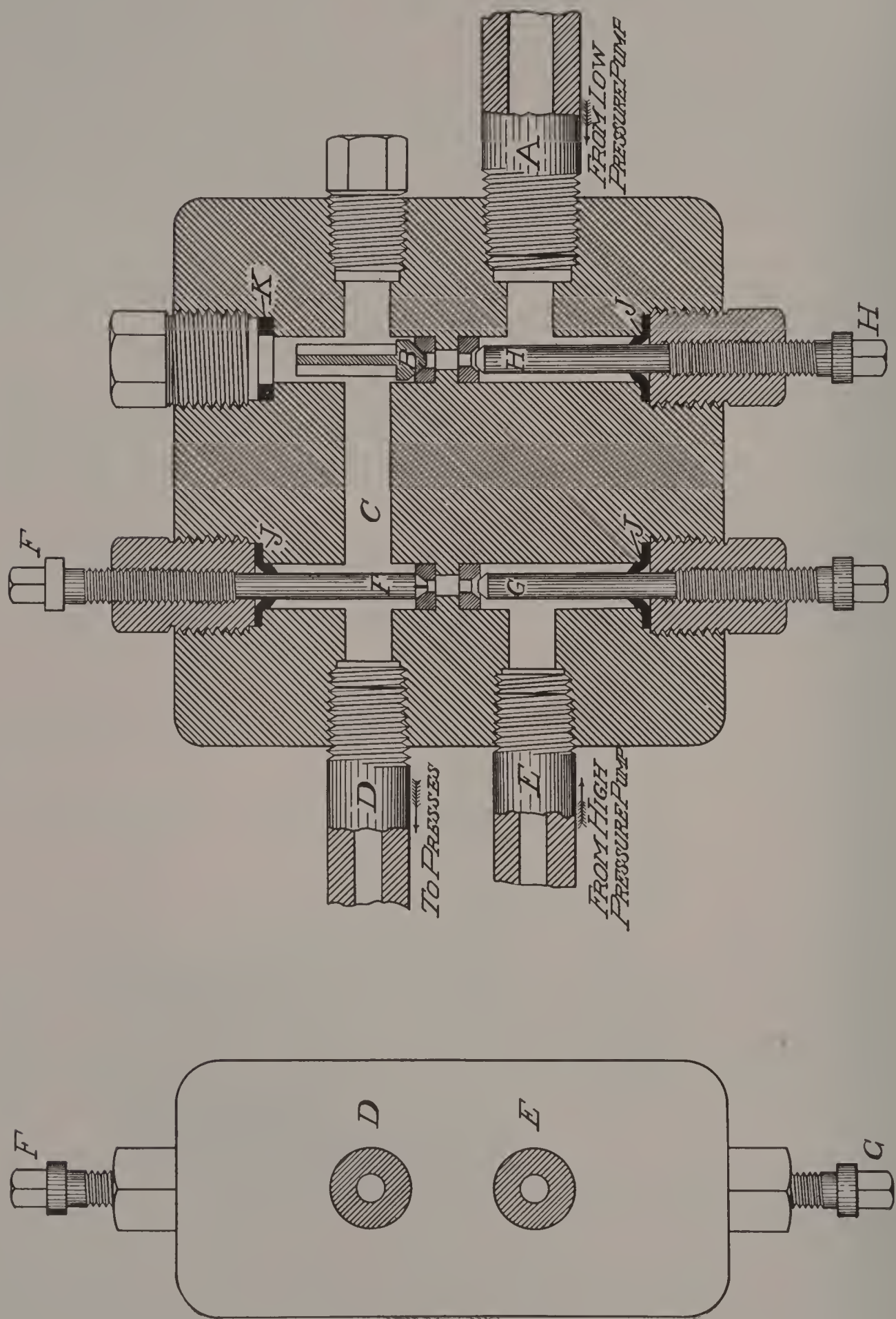


Figure 447.
New Style Automatic Change Valve.

AUTOMATIC CHANGE VALVES (Continued).

IMPROVED AUTOMATIC CHANGE VALVE, FIG. 447.—LETTERING.

Fig. 447 shows a cross section of an improved change valve, having fewer parts than any of the old forms. Both high and low pressure pumps are connected to this valve.

- A—Pipe from low pressure pump.
- B—Check over same.
- C—Port to press pipe.
- D—Pipe to press.
- E—Pipe from high pressure pump.
- F—Choke valve.
- G—Stop valve, high pressure.
- H—Stop valve, low pressure.
- J—Crimp packing.
- K—Leather gasket.

When valve at press is first opened, low pressure flows through pipe A and check B, to press.

At the same time, the high pressure pump forces oil through the slot in choke valve F. (This slot is a mere notch filed across face of valve.)

As oil passes through this choke valve its pressure becomes as low as the pressure from low pressure pump. Thus both pumps contribute to hasten the ram, and when the slack of the press is taken up, the high pressure pump, continuing to put oil through the choke valve F, gradually raises the pressure to above that of the low pressure pump. Then the check B closes, and the pressure continues to rise by the action of the high pressure pump alone. The choke valve makes this rise of pressure very gradual, and it is this regulation of the rise which saves the press cloth and makes a greater yield of oil from the presses.

HYDRAULIC ACCUMULATORS

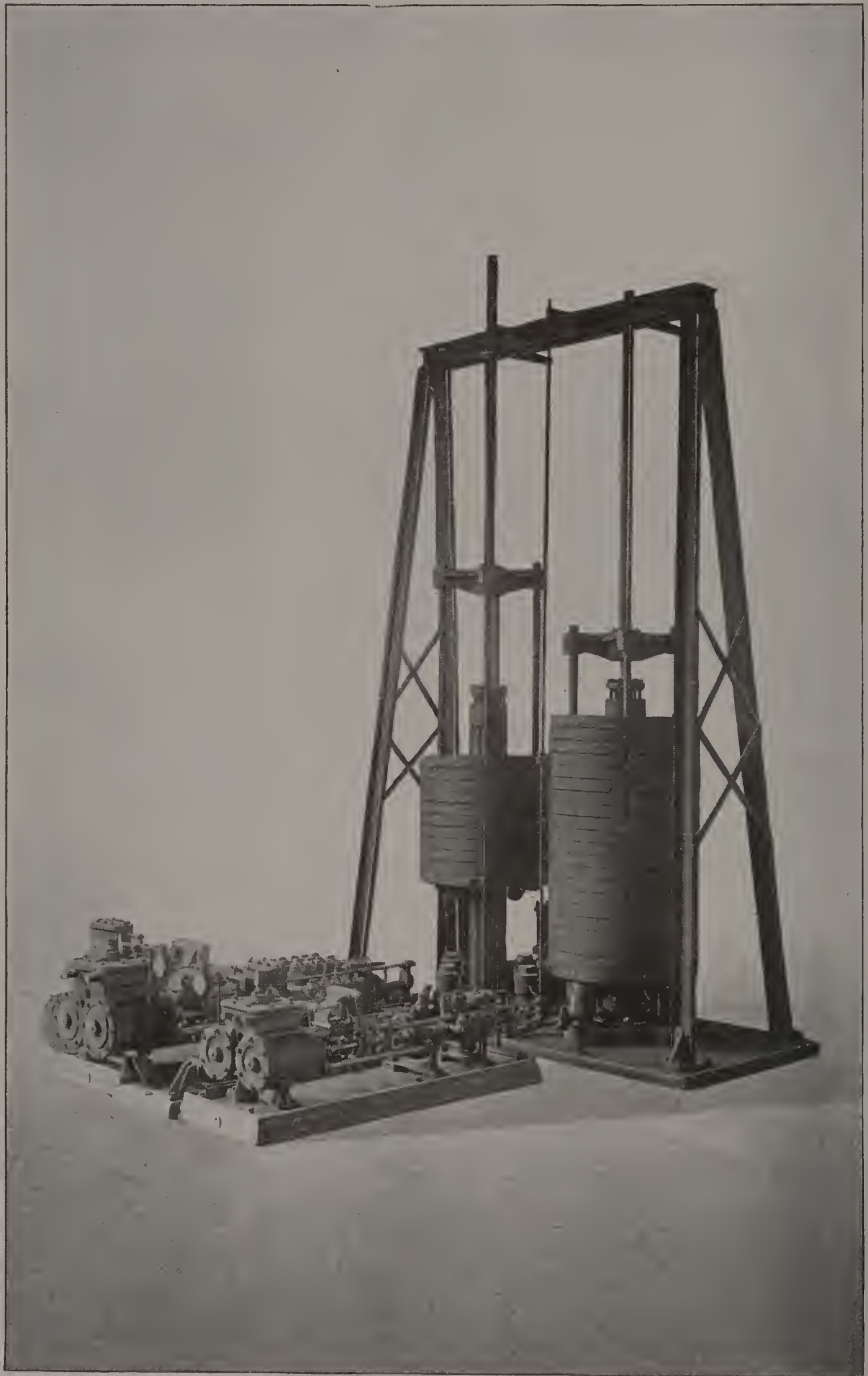


Figure 448.

Hydraulic Accumulators.

HYDRAULIC ACCUMULATORS.

HIGH PRESSURE (4,000 lbs. per sq. inch).	Weight.	Price.
One 1 1/8" dia. ram, 4 foot travel.		
One high pressure accumulator mounted on base plate and provided with housing as shown in Fig. 448.		
Complete with automatic safety-valve and checks ready to attach, arranged with tank for iron borings, requiring about 5,800 lbs. borings . . .	9,500 lbs.	\$700 00
The above arranged for wall guide	6,100 lbs.	525 00
LOW PRESSURE (400 lbs. per sq. inch).		
One 4 5/8" dia. ram, 4 foot travel.		
One low pressure accumulator, mounted on base plate and provided with housing as shown in Fig. 448.		
Complete with automatic safety-valve and checks ready to attach, arranged with tank for iron borings, requiring about 3,100 lbs. borings . . .	9,500 lbs.	700 00
The above without base plate, arranged for wall guide	6,100 lbs.	525 00

HYDRAULIC POWER PUMP.

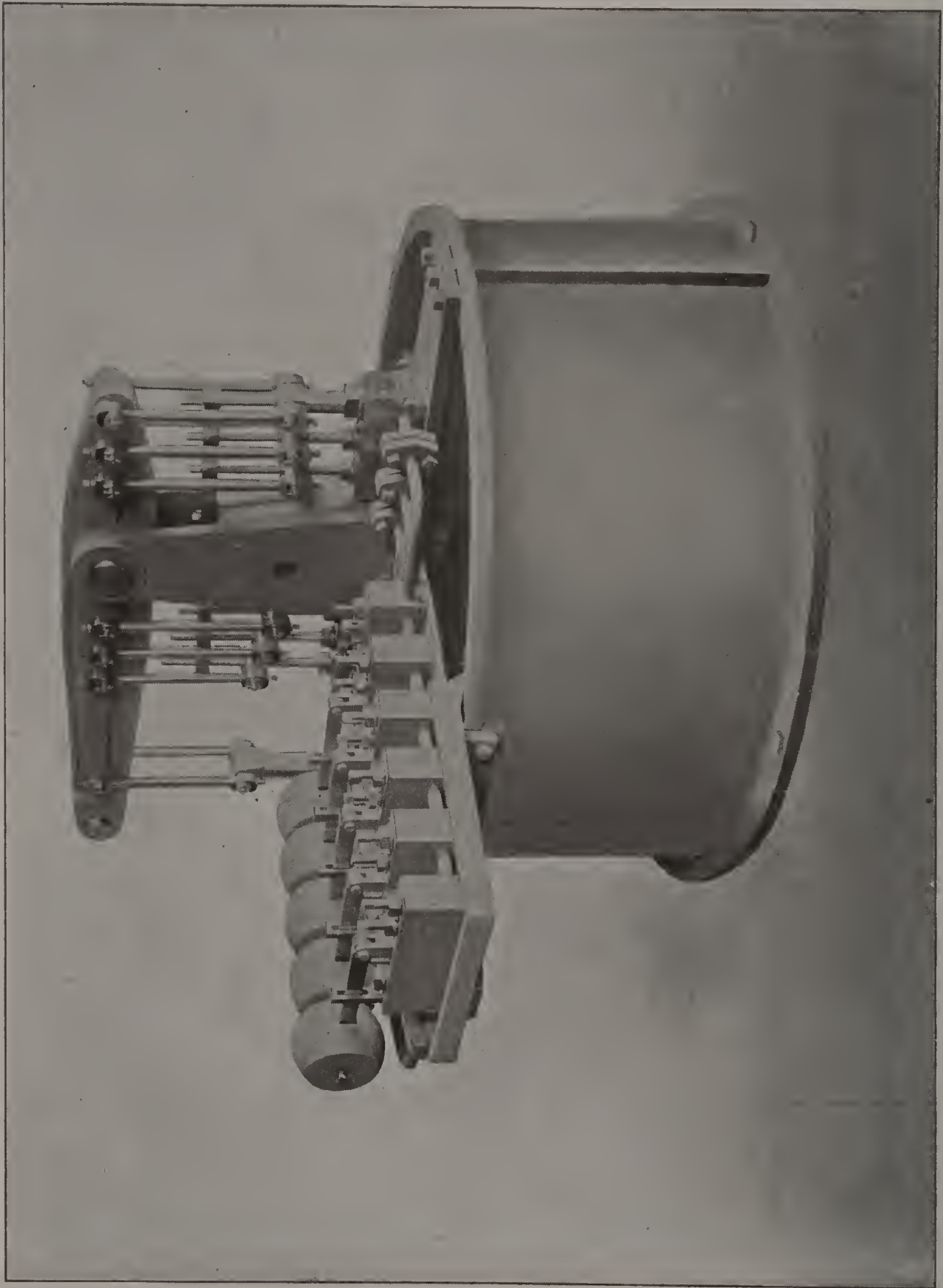


Figure 449.
Hydraulic Power Pump.

Fig. 449 represents our Hydraulic Power Pump for oil mills. While this type of pump has been supplanted to a large extent by the Duplex Hydraulic Pressure Pump (Fig. 443), many of the mills still prefer the Power Pump, and we furnish them when desired.

Prices upon application.

CAKE CRACKERS

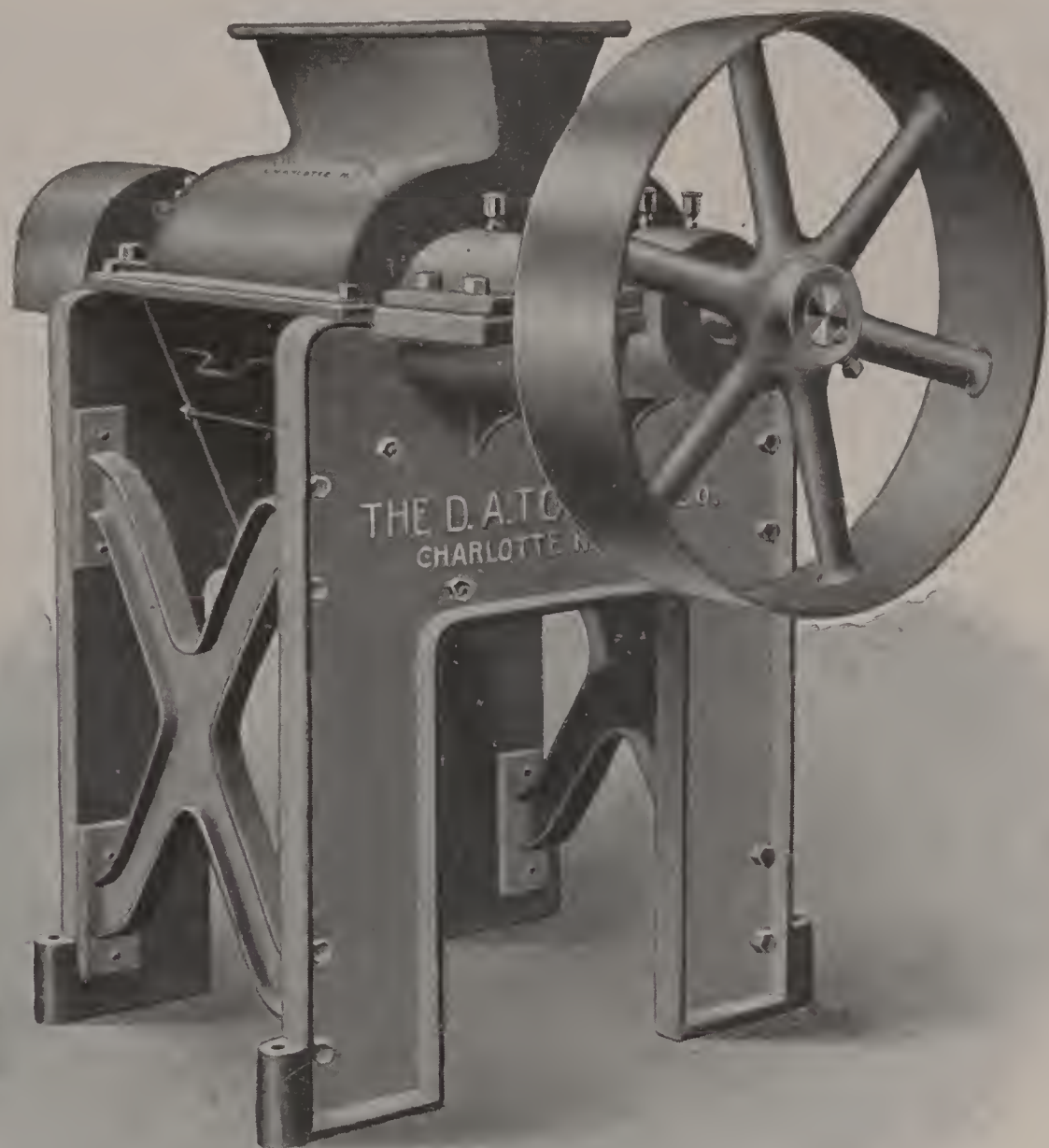


Figure 450.
TOMPKINS No. 1 CAKE CRACKER.
Improved Pattern with Steel Saws.
Made in our Shops.

Fitted with journals of extra weight and length, with interchangeable, ring-oiling bearings, which together with the one-quarter inch tempered steel saws give a machine which runs with little or no vibration, and requires but little power to operate. Cut gears are used insuring a minimum amount of noise. While there is very little danger of this machine or the conveyor directly beneath, becoming choked, should this occur the cant-boards are easily removed giving ready access to both saws and conveyor. The machine is raised high enough from the floor to allow conveyor to deliver into elevator boot without cutting a hole in the floor or blocking up the machine.

Capacity.....	about 5 tons of cake per hour
Power required.....	5 to 10 H. P.
Speed.....	250 to 300 R. P. M.
Pulley.....	24 inch dia., 6 inch face
Length (over all).....	44 inches
Width.....	30 inches
Height (from floor to top of hopper).....	45 inches
Weight.....	1200 pounds
Price.....	\$175 00

CAKE CRACKERS (Continued).

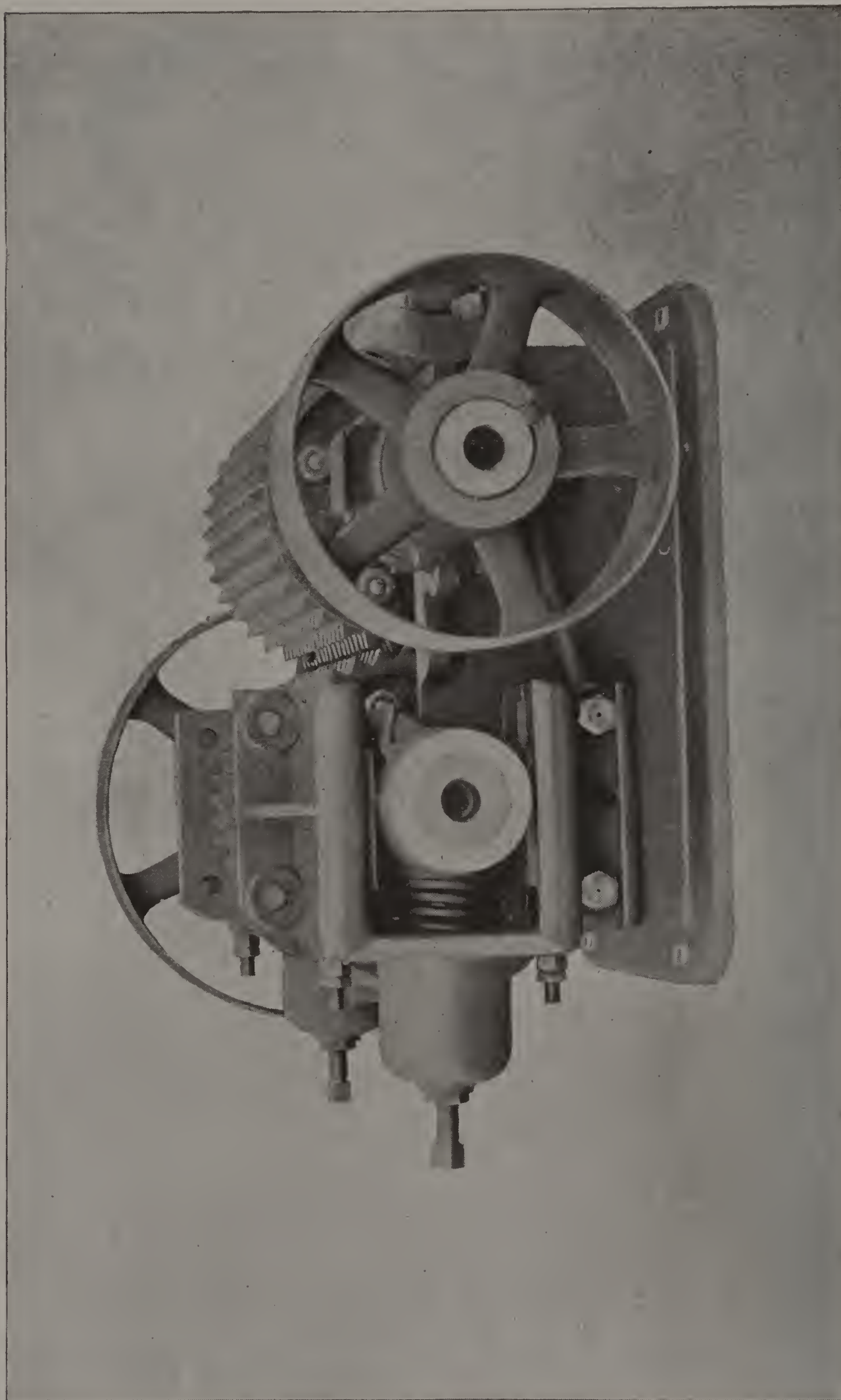


Figure 451.
NO. 5 CAKE CRACKER.

No. 5 CAKE CRACKER.

This is to crack the cake preparatory to grinding. It is extra strong and does its work perfectly.

Capacity up to 10 tons of cake per hour,

Price, \$250.00.

ATTRITION MILLS

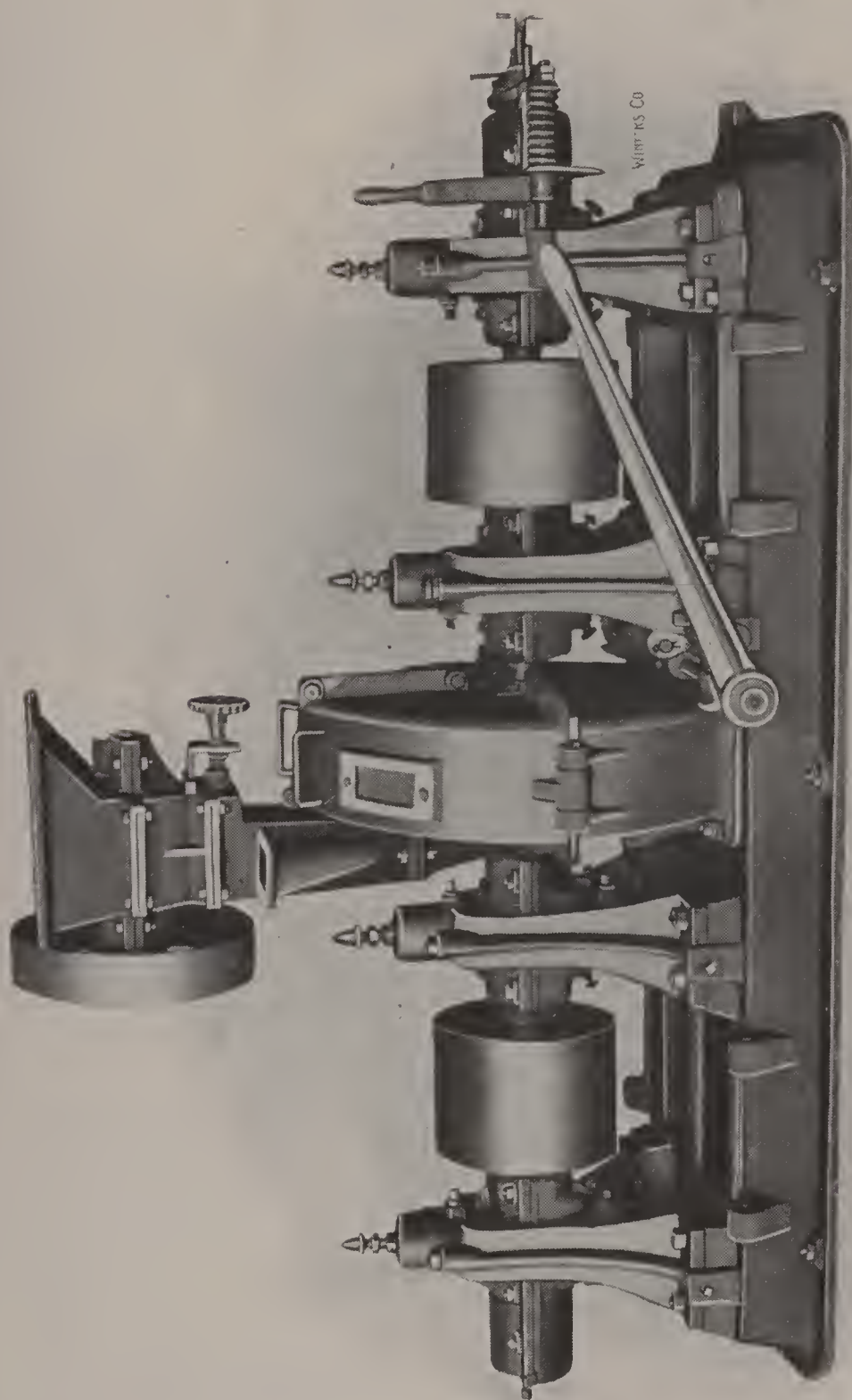


Figure 452.
SCIENTIFIC ATTRITION MILL.
For description and prices see page 342.

Scientific Combination and Scientific Attrition Mills.

	NO. 6 MILL 20 IN. PLATES	NO. 10 MILL 20 IN. PLATES	NO. 13 MILL 22 IN. PLATES	NO. 13½ MILL 24 IN. PLATES	NO. 14 MILL 26 IN. PLATES	NO. 16 MILL 30 IN. PLATES	NO. 19 MILL 36 IN. PLATES
Length over all.....	92¼ inches	100 inches	93 inches	93 inches	100 inches	100 inches	123 inches
Length on floor.....	54 inches	84½ inches	80 inches	80 inches	87 inches	87 inches	108 inches
Width over all	34 inches	37 inches	33 inches	33 inches	41 inches	44 inches	51 inches
Width on floor.....	31½ inches	36 inches	30 inches	30 inches	41 inches	41 inches	46 inches
Height to top of hopper..	56 inches	55 inches	48 inches	48 inches	50 inches	54 inches	58 inches
Floor to center of shaft..	19⅞ inches	20¾ inches	16 inches	16 inches	18½ inches	18½ inches	20 inches
Shaft—hammered steel..	2½ inches	3 inches	2½ inches	2½ inches	3 inches	3 inches	3⅜ inches
Pulleys on shafts	14x12½ inches	16x12½ inches	12x8 inches	12x8 inches	14x8½ inches	16x10½ inches	18x12 inches
Width of belt.....	6 inches	8 inches	5 inches	6 inches	7 inches	8 inches	10 inches
Feeder pulley	18x4¼ inches	18x6 inches	16x3¼ inches	16x3¼ inches	16x4 inches	16x4 inches	16x4 inches
Speed of main pulleys...	1000 to 1200	1000 to 1200	1800	1700	1450	1350	1200
Speed of feeder pulley...	350 revolutions	350 revolutions	200 revolutions	200 revolutions	200 revolutions	200 revolutions	200 revolutions
Between center of pulleys		44 inches	44 inches	44 inches	50 inches	52 inches	60 inches
Power required.....	15 to 25 H. P.	20 to 30 H. P.	15 to 18 H. P.	20 to 25 H. P.	25 to 35 H. P.	35 to 45 H. P.	45 to 60 H. P.
Weight	2200 lbs.	3500 lbs.	2550 lbs.	2650 lbs.	4000 lbs.	4800 lbs.	6000 lbs.
Price.....	\$280.00	\$380.00	\$300.00	\$325.00	\$400.00	\$500.00	\$600.00

The illustration shows a style of mill which we have used with the best success for the past five years. It will grind meal to any desired degree of fineness. If properly used it grinds meal ready for export without bolting. If it is desired to bolt it, we also furnish machinery for this purpose. Numbers 6 and 10 are Scientific Combination Mills; the others are Scientific Attrition Mills.

PRESSES.

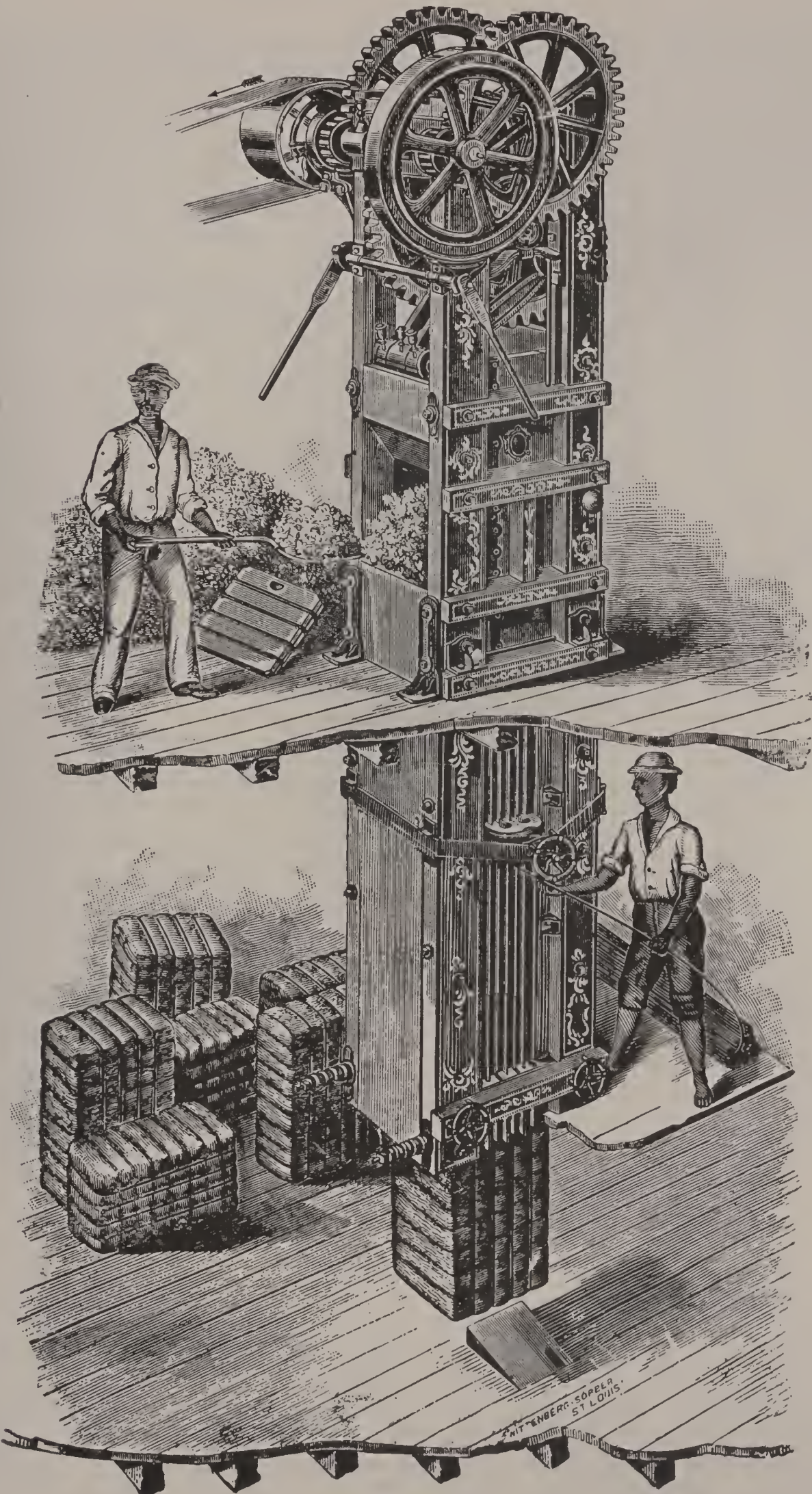


Figure 453.
Cotton Seed Hull Baling Press.

PRESSES (Continued).

COTTON SEED HULL BALING PRESS.

Fig. 453.

The Press will make bales of any length, from one to four feet, as desired. It requires two men or boys to wire the bales, one to feed and put in dividing blocks, and one to remove the bales and pass back the dividing blocks. It will bale from forty-five to sixty bales per hour, weighing over 100 pounds each, size 14 inches by 18 inches and 20 inches long. Extreme length of press frame, 18 feet, weight, about 6,200 pounds. 8 to 12 H. P. required to operate.

Price \$400 00

COTTON SEED HULL PACKER.

We make this Packer in two styles, viz.: "C" and "D." Style "C" has a friction drive and an automatic stop when sack or barrel is filled.

Style "D" has no automatic stop or friction drive. It is not intended, when packing cotton seed hulls, to stop the Packer when the sack is filled. Instead the feed is shut off and diverted to a re-tail bin. When the full sack is taken out and an empty sack put in place, the feed is again turned on. In some cases two Packers are used, one machine packing while the full sack is being replaced by an empty one in the other. The Packer will not feed from a bin. Material must be fed in by a spout.

In ordering always give the size of the sacks laid flat on the floor, stating the length and width. Also state whether the counter shaft is to extend to right or left hand side as you stand facing the Packer, and whether the auger shaft is to run with or against the sun.

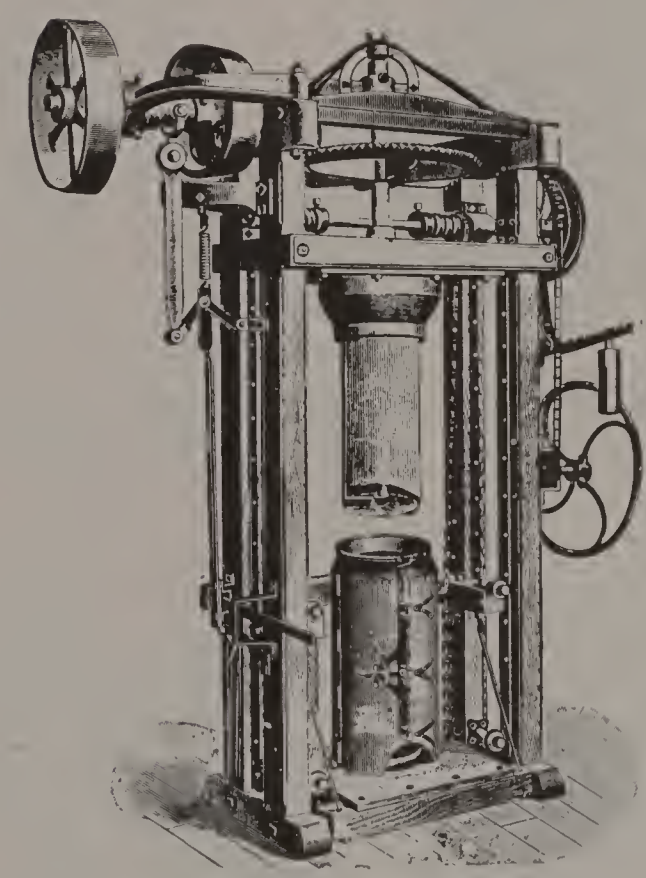


Figure 454.

DIMENSIONS, PRICE AND WEIGHT.

Style C or D.

Extreme height	9' 2"	Speed	200
Size on floor	4' 1" x 2' 9"	Large gear, teeth	60
Size of pulley	24" x 6½"	Small gear, teeth	24
Floor to center of pulley	8' 0"	Weight	2,100
Price, with outfit for one size sack, any size	\$350 00		
Each additional outfit, consisting of tube, auger and outside case	36 00		
Each additional tube and auger	12 00		
Each additional outside case	24 00		

PRESSES (Continued).



Figure 455.

LINT BALING PRESS.

Of strong and durable construction, using little power and will pack a symmetrical bale to any reasonable density. The screws are three and one-quarter inches in diameter. Driven by one belt, which runs all the time, being operated by clutch. Automatic trip for throwing the Press out of gear when it runs down.

Either down or up packing Press furnished, as desired.

Prices upon application.

COTTON SEED DELINTING.

Many types of machines have been built to take the short lint off cotton seed, leaving the seed black like the seed of Sea Island cotton or from Egyptian cotton. These machines are usually called Delinters or Delinting machines. The class of machine now on the market are those having corundum blocks held in cylindrical shape to make a concave, and a cylinder with other blocks or steel vanes to carry the seed around or plow through them. Between the corundum blocks is perforated metal through which the lint is drawn by a suction fan. This may be condensed on an ordinary gin condenser having fine wire screen to catch it, or it may be collected in a cyclone dust collector.

Delinted seed are generally exported. The price of these vary in foreign markets and the profit of the delinting business depends on the price of seed in England and France. Sometimes there is profit, but generally speaking the business up to date has not been continuously prosperous. In making estimates these facts should be kept in mind: The American ton is 2,000 pounds; when the lint is taken off there is about 1,750 pounds; the English ton is 2,240 pounds. There seems to be very little market for the lint. Besides these features the power required is very considerable. Except at coast points there would be two freights to pay in the United States—one in to the mill and one out to the port—and although the seed are comparatively free from heating when delinted they are not wholly immune and claims from this and other causes in foreign markets are considerable.

Delinting machines have been made in which a cone cylinder is lined with emery blocks and the seed brushed out against these by strips of sheepskin or other leather, and others still having fine cut saws like gin saws plowing through slitted cylinders full of packed seed. The action of all the machines warms the seed (sometimes too much) and this dries them and makes them more free from spoiling.

DELINTING MACHINES.

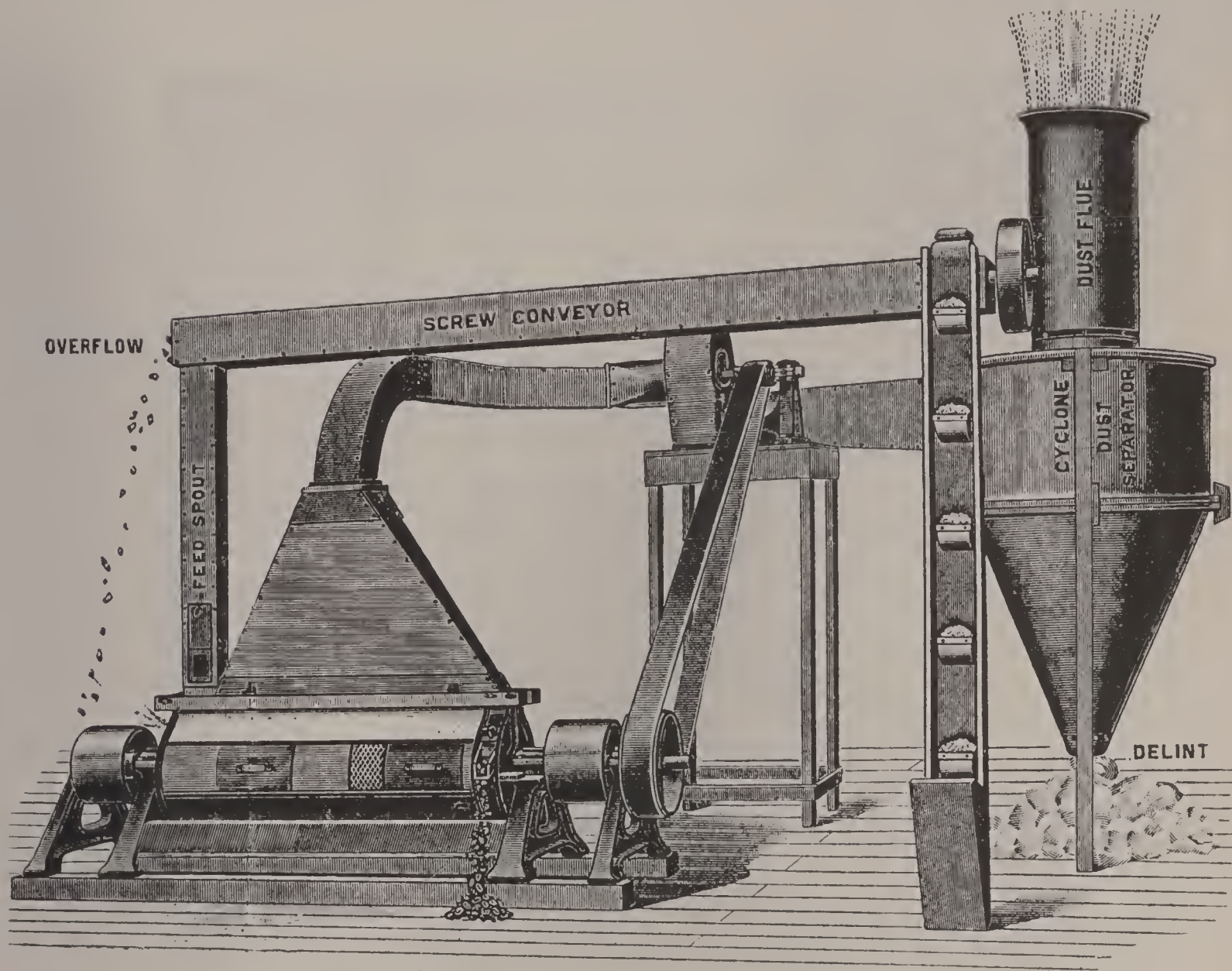


Figure 456.

Capacity, 15 tons in 24 hours. Power to operate, 15 H. P. Shipping weight, 3,000 pounds.

Price \$1,300 00

Delinting and Grinding Cotton Seed Hulls.

The object of delinting and grinding cotton seed hulls is to sell them at a higher price than they bring as a coarse cattle feed. The machinery to separate the lint and hull has been successfully made but the operation has not so far been a commercial success. When separated the lint is sold for paper stock but it has not competed successfully with wood pulp and other paper stock. The hull, being fine ground, is mixed with the meal before it goes in the press and some people claim it makes the cake porous and lets out more oil. In the cake it is an adulterant and there are many other cheaper adulterants that would do as well. There may be other and entirely proper uses for the hull and lint when separated that we are not aware of.

DELINTING MACHINES (Continued).

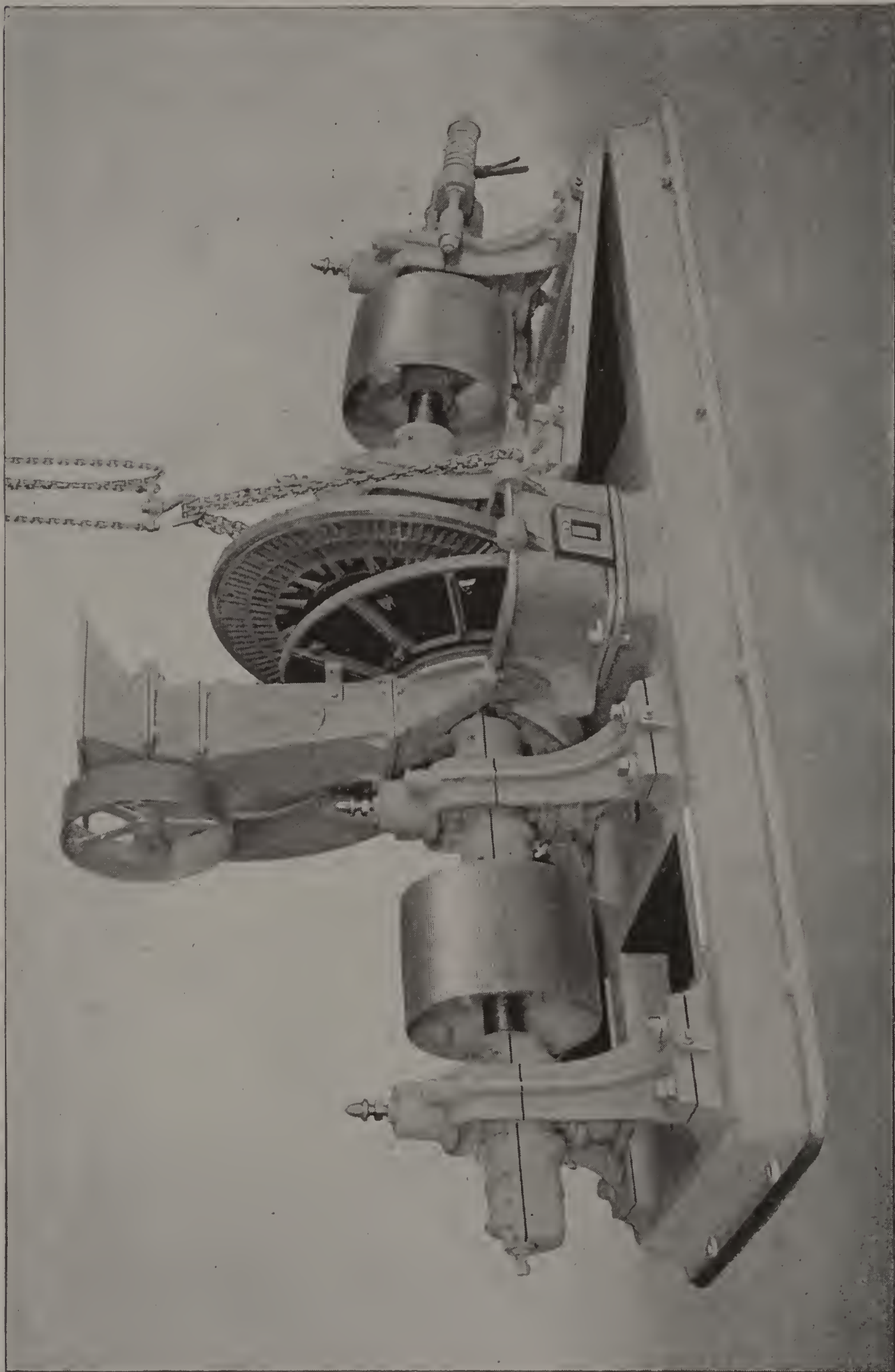


Figure 457.

Hull Delinting and Grinding Machine.

Capacity (22-inch plate) 15 to 18 tons in 12 hours.	Power to operate, 15 to 18 H. P.	Shipping weight, 2,550 pounds.
Price		\$300 00

FERTILIZER MIXER.

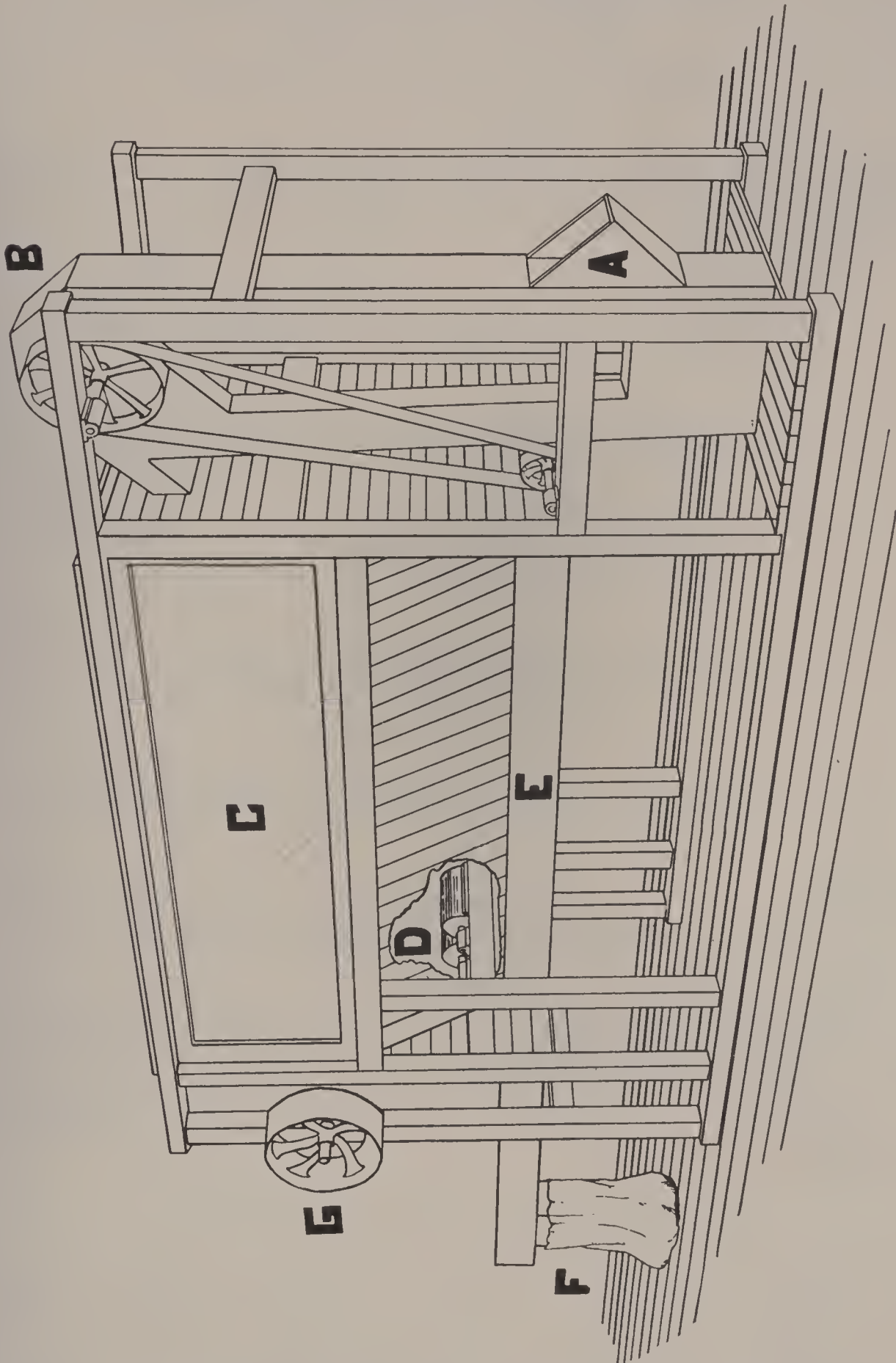


Figure 458.
Fertilizer Mixer
Made in our Shops.

Elevator B delivers the material into revolving screen within part marked C. The uniformly fine mixture is hopped to conveyor E which carries it to bagging spout F. The lumpy materials which will not pass through the meshes or perforations, roll out the lower end of screen, and are ground between the rolls D and delivered to the conveyor.

PRICE LIST.

Small machine to mix 7-10 tons per day		\$225 00
Large machine to mix 15-20 tons per day		500 00

CONVEYORS.

Conveyors run by belts will convey either way by crossing the belt. Changing a Conveyor, end for end, does not change from right to left hand. In ordering, be sure to give length and diameter of driving ends.

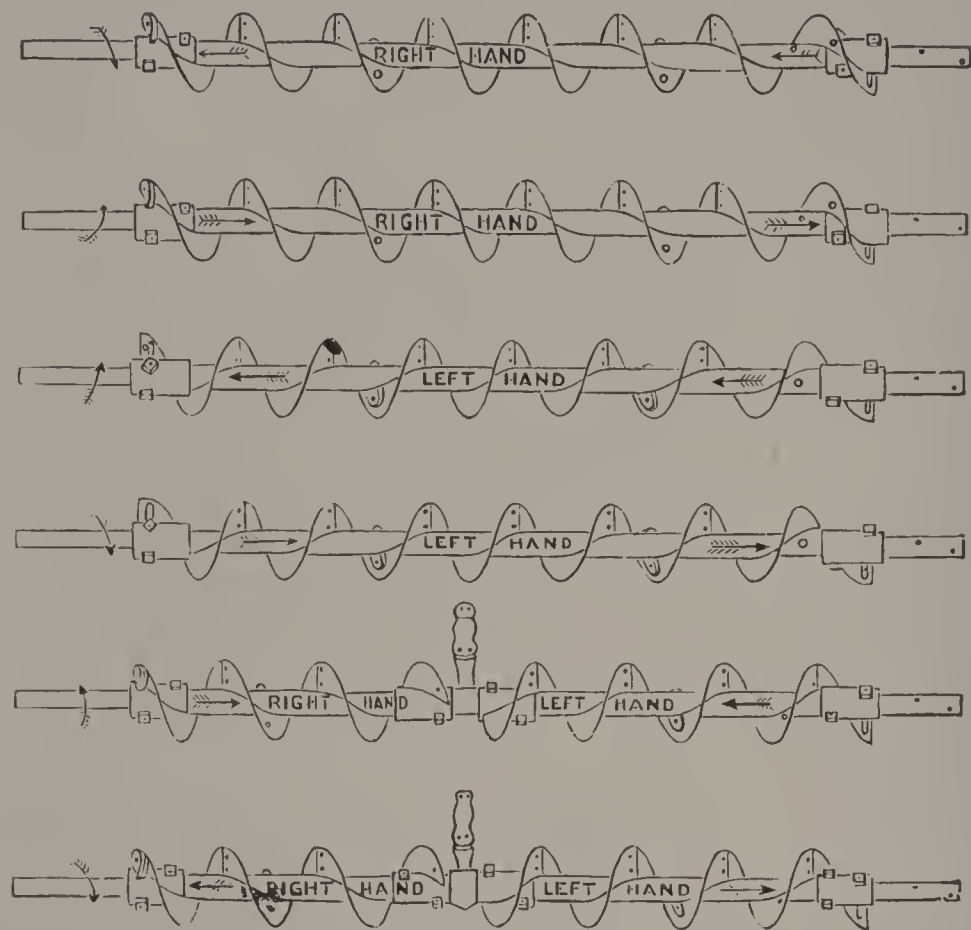


Figure 459.

The arrows indicate which way the Conveyor turns and which way the material is carried. Conveyors should run 150 revolutions per minute.

An extra charge is always made for driving ends, including the part going into pipe. We carry a large stock of regular sizes and lengths, made up, thereby insuring to our customers prompt shipment.

PRICE LIST, SPIRAL STEEL CONVEYOR.

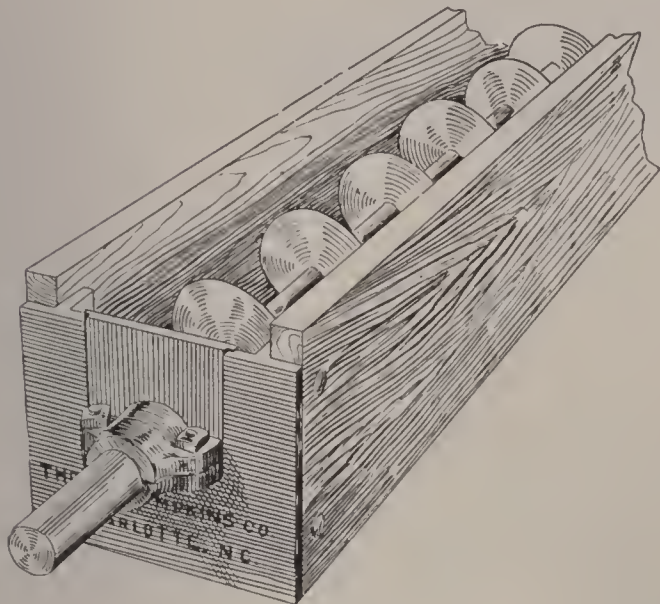
Diam. in Inches.	Standard Lengths.	Inside Diam. of Hollow Shaft.	Max. Speed	Guaranteed Capacity per hr. Bushels	Price per foot, Steel Flights.	Price per foot Galvanized Iron.
4	8 ft.	1 inch	100	100	\$ 1 00	\$ 1 28
6	10 ft.	1½ inch	140	300	1 67	2 03
9	10 ft.	1½ inch	150	1,000	2 00	2 68
12	12 ft.	2 inch	160	2,000	2 80	3 48
16	12 ft.	2 inch	160	3,000	3 75	4 83
16	12 ft.	3 inch	160	4,000	5 08	6 38
18	12 ft.	3 inch	160	5,000	6 15	7 79

The Standard Lengths, as given above, include the width of one Hanger Bearing. These prices include Hangers, Curved Sheet Iron Lining, Couplings and Bolts complete.

CONVEYORS (Continued).

CONVEYOR BOX END.

To make a Firm Bearing for Driving End.



Diameter Conveyor.	Diameter Shaft.	Price.
4-inch	1 -inch	\$1 50
6 "	1½ "	2 00
8 "	1½ "	2 75
9 "	1½ "	3 00
9 "	2 "	3 25
10 "	1½ "	3 75
10 "	2 "	4 25
12 "	2 "	6 00
12 "	3 "	6 75
14 "	2 "	7 50
16 "	2 "	9 00
16 "	3 "	10 00
18 "	3 "	12 00

Figure 460.

COUNTERSHAFT BOX END FOR CONVEYOR.

Used for Driving Conveyors at right angle to line shaft.

PRICE LIST.

Including the cast-iron box end, necessary drive end projection for the conveyor, gears and short countershaft projecting far enough to take sprocket wheel or pulley.

For 4-inch Caldwell Conveyor .	\$ 8 00
For 6 " " "	10 00
For 9 " " "	15 00
For 12 " " "	26 00
For 16 " on 2-in. "	40 00
For 16 " on 3-in. "	45 00

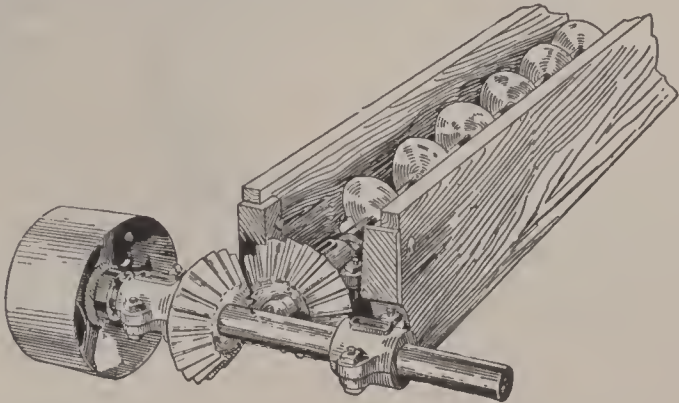


Figure 461.

RIGHT ANGLE DRIVE FOR CONVEYOR.

Used for Conveying Cotton Seed around a corner.

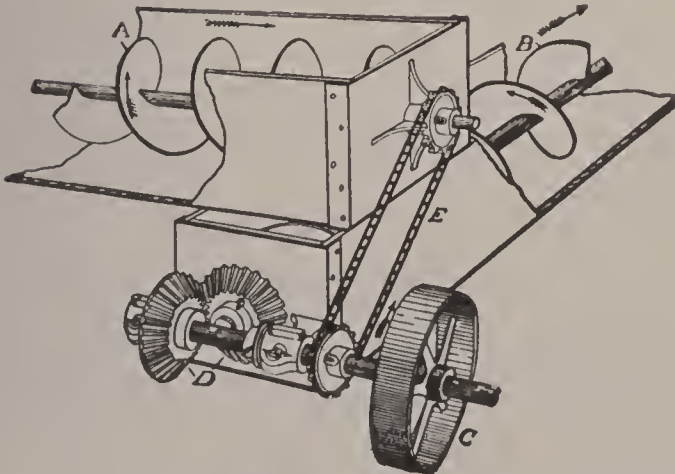


Figure 462.

PRICE LIST.

Subject to Discount.

For 4-inch Caldwell Conveyor .	\$11 50
For 6 " " "	17 50
For 9 " " "	21 00
For 12 " " "	38 00

CONVEYORS (Continued).

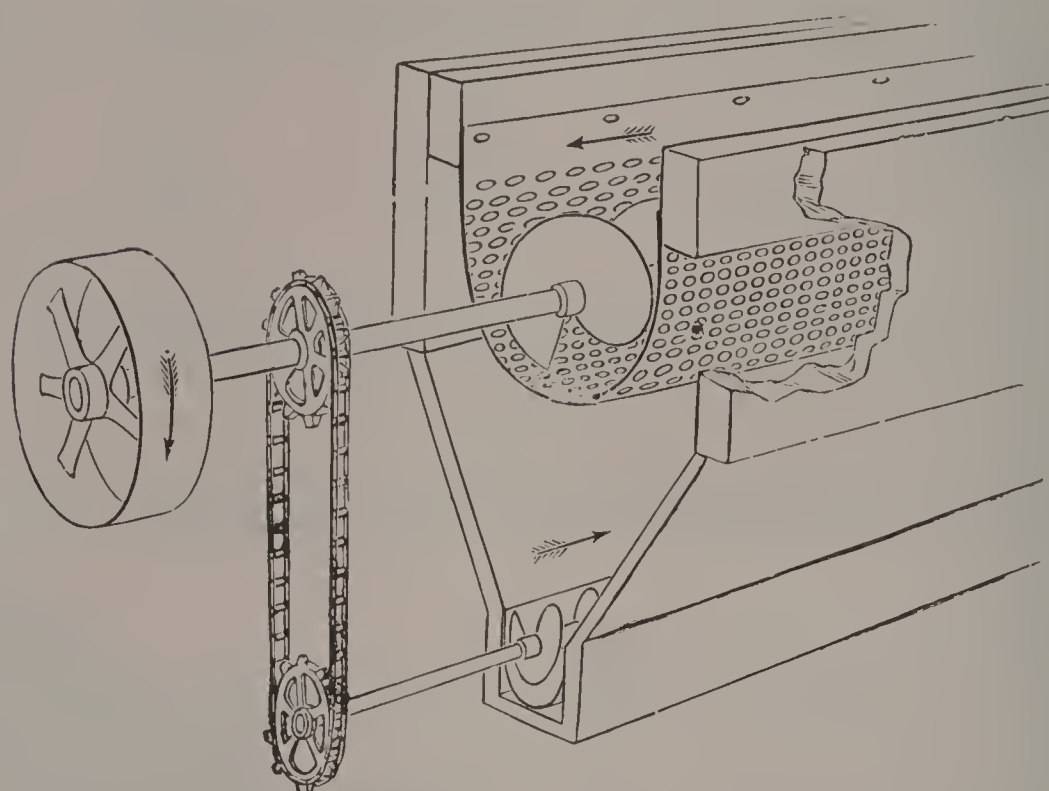


Figure 563.

Separating Conveyor.

The hulls which come from the Separating Screen are carried to the place of storage or shipment in a conveyor having a perforated bottom, so that the meats yet remaining in the hulls are sifted through and removed by a smaller conveyor underneath. This arrangement is shown in Fig. 463, where the hull conveyor is shown as right hand, bringing the hulls away from the Screen, and the small conveyor left hand, carrying the meats back. It is usual to equip 40 to 60 feet of the hull conveyor in this manner. Sometimes this portion of the conveyor is made with cut flights, or interrupted spirals, for the purpose of stirring the hulls to perfectly shake out the small particles of entangled meats,

CONVEYOR LINING.



Figure 464.

Plain Lining.

The following prices are for curved steel lining made from our regular widths of standard gauge metal.

Diameter conveyor		4 in.	6 in.	9 in.	12 in.	16 in.
Linings, per foot		\$0 05	\$0 06	\$0 10	\$0 13	\$0 23

Prices on extra heavy linings upon application.

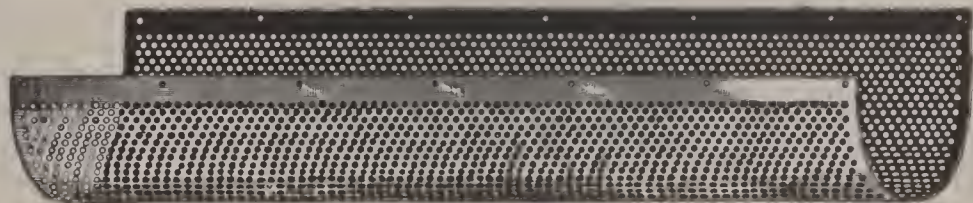


Figure 465.

Perforated Lining.

The use of Conveyor, either with regular or cut flights, running in a box lined with perforated metal, is a most effective and economical method of separating sand, dirt, grit and other foreign substances from cotton seed and other material. Where so used the lining should be wider than our regular plain lining and the metal should be of heavier gauge.

The prices for perforated lining vary with the size of the perforations the width of lining (before rolling) and the gauge of metal used.

We recommend where perforated lining is used that the metal be wider than is employed for making the plain steel lining, and in asking for price it would be well to specify the width and gauge of metal as well as the size of perforation.

STANDARD SIZES OF PERFORATED CONVEYOR LININGS.

For 9-inch Linings, sheets 15¾ to 18 in. x 30 in. or longer, 1 in. margin on sides, rolled to circle of 10 inches.

For 12-inch Linings, sheets 20½ to 24 in. x 30 in. or longer, 1½ in. margin on sides, rolled to circle of 13 inches.

For 16-inch Linings, sheets 28 to 30 in. x 30 in. or longer, 2 in. margin on sides, rolled to circle of 17 inches.

Nail holes in side margin ¼ inch diameter and 4 inches apart.

PERFORATED METALS.

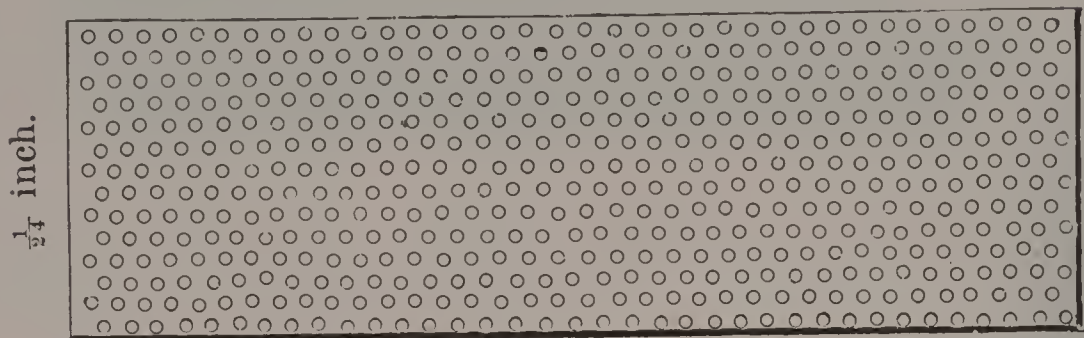


Figure 466.

We furnish this work in iron, steel, copper, brass, zinc or tin.

It is very difficult to make an intelligent price list on perforated metal, as so many things are to be taken into consideration. We will make estimates on any class of work wanted, asking our customers to give us the following information:

First. Kind of metal and size of sheets each way.

Second. Size of perforation, round, slot or oval. If slot or oval, which way of the sheet the perforations are to run.

Third. Gauge or thickness of metal.

Fourth. The width of margins, and if screw holes or nail holes are wanted to fasten to frame. Send diagram as shown below.

Fifth. Flat or rolled.

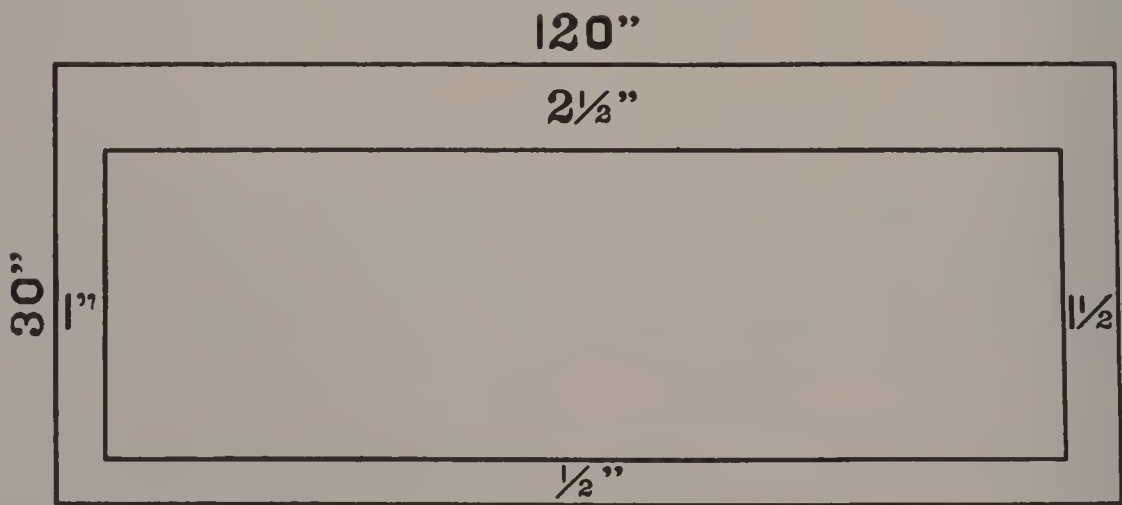


Figure 467.

Customers will readily understand that large numbers of sheets of one-sized hole can be perforated cheaper in proportion than small orders. However, we will, whenever possible, bunch orders to save our customers expense in this way.

Prices on application.

CONVEYOR BOXES.

It is generally cheaper and preferable for the box to be made on the premises and placed in position where wanted, rather than to have us make it. The box is not easy to transport and is generally warped and twisted out of shape by shipping and handling.

It is a good plan to make conveyor boxes of seasoned lumber dressed on all sides, unless for very rough work. Place box in straight and level as possible and fasten well to supports as often as convenient. The more solid the box the better. To prevent the box from spreading, put cleats across the top every four feet. Make bearing for driving ends independent of box on large or long conveyors.

Where for special reasons it is desirable to have the box furnished for the conveyor, we shall be pleased to quote price on the conveyor complete, fitted in the wooden box.

INFORMATION USEFUL IN MAKING CONVEYOR BOXES.

Conveyor Boxes should always be made of kiln-dried lumber, as any shrinkage causes the Conveyor to run out of true. For 4-inch Conveyor Boxes, we recommend 1-inch lumber; for 6-inch and 9-inch, 1½ inch; for 12-inch and larger, 2 inches thick.

The following table will show the proper size to make the boxes for Conveyors:

Diameter of Conveyor.	Drop of Hanger.	Depth of Box, Inside Measure.	Width of Box, Inside Measure.
4 inches.	2½ inches.	4¾ inches.	5 inches.
5 “	3 “	6 “	6 “
6 “	3½ “	7 “	7 “
8 “	4½ “	9 “	9 “
9 “	5 “	10 “	10 “
10 “	7 “	12½ “	11 “
12 “	7½ “	14 “	13 “
14 “	8¾ “	16¼ “	15 “
16 “	9½ “	18 “	17 “
18 “	10½ “	20 “	19 “

To get the best service out of Conveyors, they should be run close to the bottom of trough—for 4 and 6 inch, say, ⅛ inch play; for larger sizes, a little more.

(Continued on following page.)

CONVEYOR BOXES (Continued).

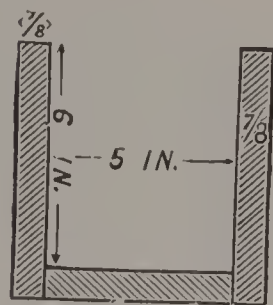


Figure 468.

4-Inch Conveyor Box.

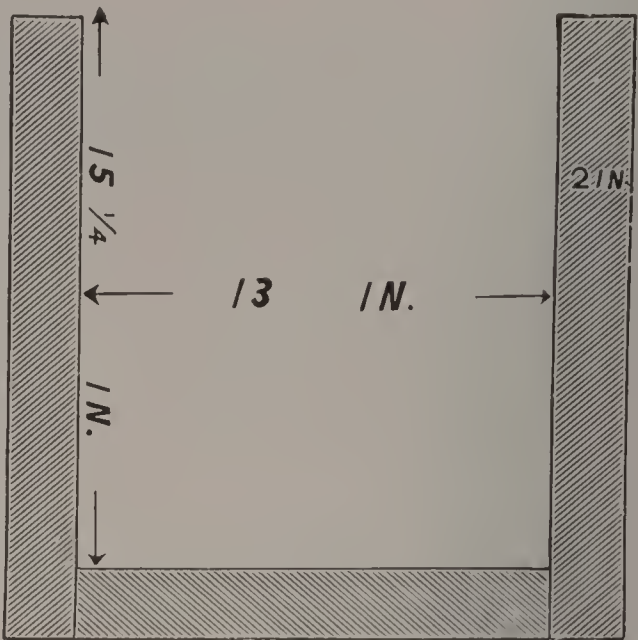


Figure 471.

12-Inch Conveyor Box.

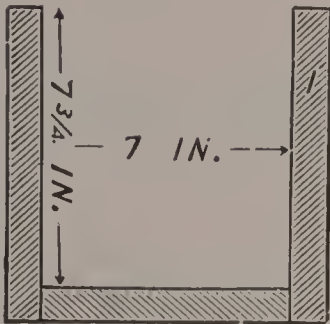


Figure 46.

6-Inch Conveyor Box.

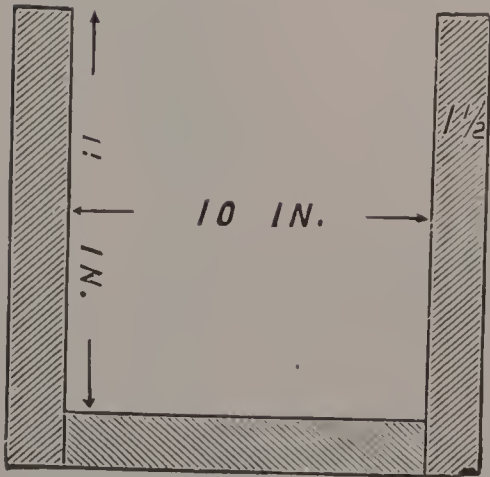


Figure 470.

9-Inch Conveyor Box.

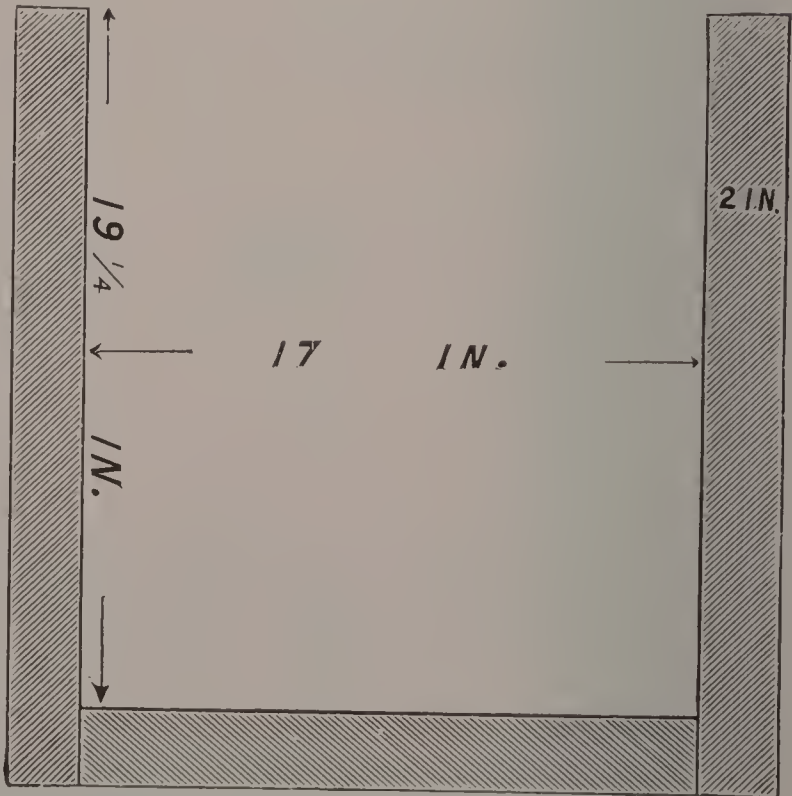


Figure 472.

16-Inch Conveyor Box.

Wooden Boxes for Conveyors.

ELEVATORS.

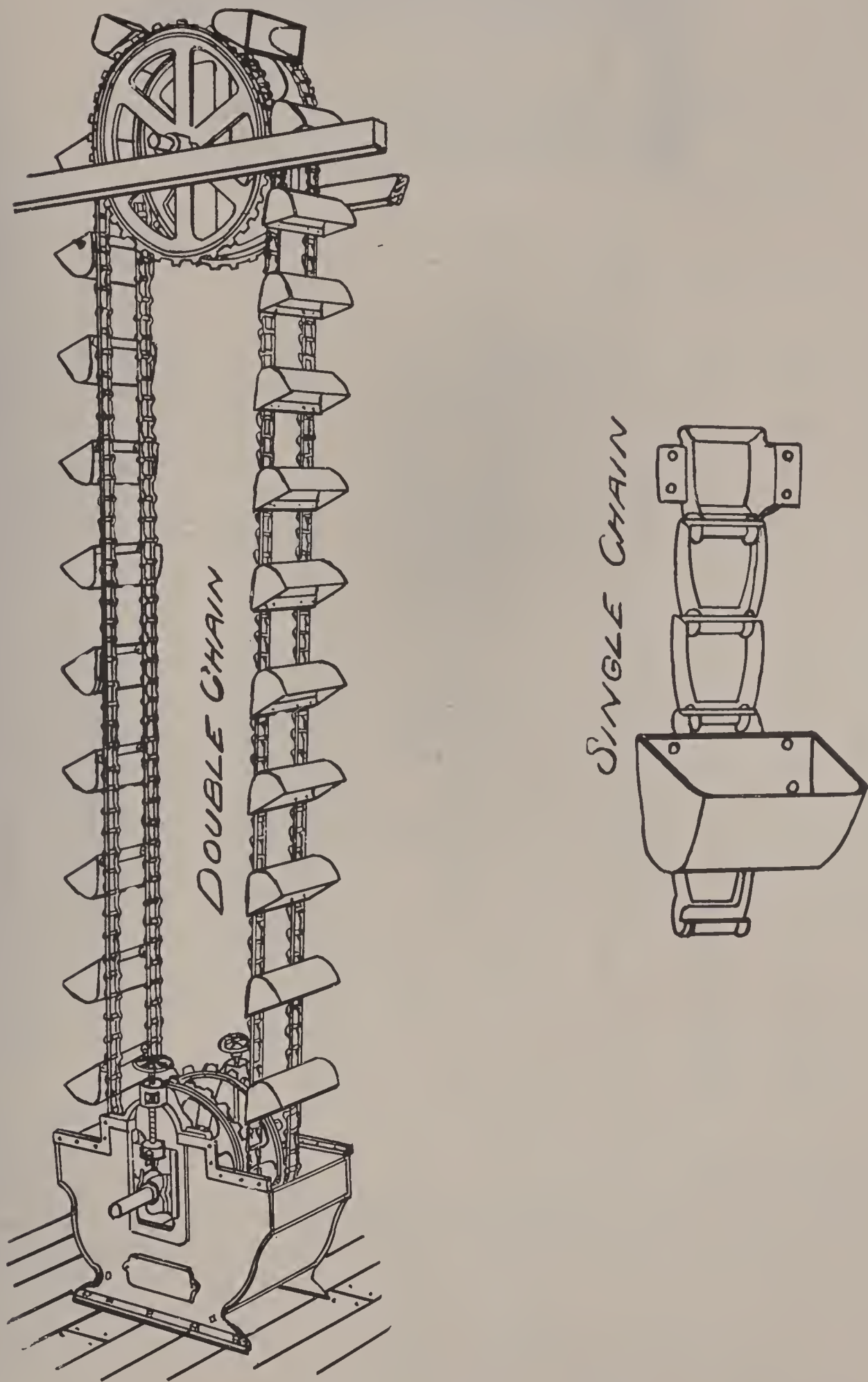


Figure 473.

Sprocket Chain Elevators.

Price List Link Belting and Attachments.

No.	PRICE PER FOOT.			Links per Foot.	Pitch of Links in Inches.	Working Strain. Pounds	Equivalent in Leather Belting.		Price Coupling Links per Pair.
	All Plain Links.	All At- tachment Links.	With At- tachm'ts at Intervals						
25	\$ 12	\$ 28	\$ 17	13.3	.902	75	1	in. single.	\$ 0 06
32	12	25	17	10.4	1.153	150	1½	" "	06
33	12	25	17	8.6	1.395	200	2	" "	07
34	12	25	17	8.6	1.395	225	2½	" "	08
35	12	25	17	7.4	1.621	250	2½	" "	08
42	13	27	18	8.8	1.363	300	3	" "	11
45	13	27	18	7.4	1.621	350	3½	" "	11
51	17	30	22	10.4	1.153	375	3½	" "	12
52	18	30	22	8	1.5	500	4	" "	12
55	18	28	21	7.4	1.621	450	4	" "	12
57	18	36	24	5.2	2.307	600	6	" "	17
62	24	41	30	7.3	1.643	650	6½	" "	18
66	24	41	30	6	2	700	6½	" "	18
67	24	41	30	5.2	2.307	700	7	" "	18
75	28	45	34	4.6	2.609	750	7½	" "	21
77	28	45	34	5.2	2.307	800	8	" "	21
78	32	50	40	4.6	2.609	1000	10	" "	28
83	36	67	53	3	4	1200	12	" "	37
85	40	70	54	3	4	1300	9	" double.	50
88	38	68	53	4.6	2.609	1200	8	" "	32
93	45	70	56	3	4	1600	10	" "	50
95	48	70	68	3	4	1600	10	" "	60
103	60	90	75	4	3.056	1800	12	" "	66
105	54	75	65	2	6	1500	10	" "	90
108	60	100	82	2.55	4.706	1800	12	" "	90
110	75	120	90	2.55	4.706	2000	13	" "	1 05
114	75	96	87	3.7	3.243	2000	13	" "	96
122	90	140	115	2	6	2200	15	" "	1 80
124	90	150	120	3	4	2250	17	" "	1 35
146	90	140	115	2	6	2800	19	" "	
160	125	180	150	1.2	10	4000			

The above prices of attachments are for A1, A2, A3, A7, A11, C1, E1, E2, F2, G1, G6, H1, H2, K1, K2, M1, M3, R1, R3, S1 and S2, and as they are now made for the respective chains. Other attachments will be furnished at special prices.

ELEVATOR BUCKETS.



Figure 474.
Elevator Buckets, Heads and Boots.
Seamless Steel, all Corners Round.

PRICE LIST.

Width on Belt.	Projection.	Capacity cubic inches.	Capacity quarts.	Elevating bushels per hour.	List.
2	x 2	.....	.....	.....	\$ 12
2½	x 2¼	9.054	.134	50¼	13
3	x 3	15.77	.234	88	15
3½	x 3	17.63	.261	98	18
4	x 3	23.1	.343	128⅝	20
4½	x 3½	32.23	.48	180	22
5	x 4	42.88	.64	240	24
5½	x 4	50.6	.75	281¼	28
6	x 4	62.106	.92	345	34
7	x 4½	88.	1.31	491	44
8	x 5	116.67	1.73	649	54
9	x 5½	156.76	2.32	811	68
10	x 5½	173.65	2.57	963	80
11	x 6	231.29	3.42	1,282½	92
12	x 6½	282.25	4.18	1,567½	1 04
14	x 6½	338.94	5.02	1,882½	1 20
16	x 6½	401.25	5.94	2,227½	1 60
18	x 7	524.38	7.75	2,906¼	2 00
20	x 7	807.75	11.96	4,485	2 40

ELEVATOR BUCKET BOLTS.

For Flat Belting.
PRICE, IN BOXES CONTAINING 100.

CORRUGATED BOLT.									
½-inch	x	¼-inch	.	.	.	\$1 00	⅞-inch	x	¼-inch
⅝	"	x ¼ "	.	.	.	1 00	1 "	x ¼ "	.
¾	"	x ¼ "	.	.	.	1 00	.	.	.
SLOTTED-HEAD BOLT.									
½-inch	x	¼-inch	.	.	.	\$1 00	⅞-inch	x	¼-inch
⅝	"	x ¼ "	.	.	.	1 00	1 "	x ¼ "	.
¾	"	x ¼ "	.	.	.	1 00	.	.	.
FLAT-HEAD BOLT.									
½-inch	x	⅜ -inch	.	.	.	\$2 00	1½-inch	x	¼-inch
⅝	"	x ¼ "	.	.	.	2 00	¾ "	x ⅝ "	.
¾	"	x ¼ "	.	.	.	2 20	⅞ "	x ⅝ "	.
⅞	"	x ¼ "	.	.	.	2 30	1 "	x ⅝ "	.
1	"	x ¼ "	.	.	.	2 30	1¼ "	x ⅝ "	.
1¼	"	x ¼ "	.	.	.	2 40	1½ "	x ⅝ "	.

ELEVATOR BUCKET BOLTS FOR LINK BELTING.

PRICE, IN BOXES CONTAINING 100.

BUTTON-HEAD BOLTS.

$\frac{3}{16}$ -inch diameter bolts are used with link-belt bucket attachments Nos. 25 to 55, inclusive. For Nos. 57 to 88, inclusive, $\frac{1}{4}$ -inch diameter bolts are used.

$\frac{1}{2}$ -inch x $\frac{3}{16}$ -inch	\$0 90	$\frac{5}{8}$ -inch x $\frac{1}{4}$ -inch	\$1 00
$\frac{5}{8}$ " x $\frac{3}{16}$ "	90	$\frac{3}{4}$ " x $\frac{1}{4}$ "	1 00

SQUARE-HEAD BOLTS.

These bolts are used with link-belt bucket attachments for No. 85 chain and larger sizes.

$\frac{1}{4}$ -inch x $\frac{3}{4}$ -inch	\$1 70	$\frac{5}{16}$ -inch x $\frac{3}{4}$ -inch	\$2 00
$\frac{1}{4}$ " x 1 "	1 70	$\frac{5}{16}$ " x 1 "	2 00

SPECIAL SQUARE-SHANK BOLTS.

We recommend these bolts for use with link-belt attachments where the holes in the link-belt are square.

$\frac{1}{4}$ -inch x $\frac{3}{4}$ -inch	\$1 00	$\frac{3}{8}$ -inch x 1 -inch	\$1 50
$\frac{1}{4}$ " x 1 "	1 00	$\frac{3}{8}$ " x 1 $\frac{1}{4}$ "	1 50
$\frac{5}{16}$ " x $\frac{3}{4}$ "	1 20	$\frac{3}{8}$ " x 1 $\frac{1}{2}$ "	1 50
$\frac{5}{16}$ " x 1 "	1 20		

SPECIAL CANVAS-STITCHED BELTING.

FOR ELEVATORS.

This belt is made of the best grade of duck of a special weave, is stitched, and being treated with a special compound, gives long wear, great strength and minimum stretch. The compound with which the duck is treated protects the duct from wet or dampness, and this belt is not injured by heat, cold or steam, gas or acid fumes.

We especially recommend this belting for use as elevator belts where the material to be handled injuriously affects ordinary belting.

PRICE LIST.

Three feet extra charged for splice on endless belts.

4-Ply. Equal to Single Leather. Per Foot.	6-Ply. Equal to Double Leath- er. Per Foot.	8-Ply. Equal to Heavy Double Leather. Per Foot.	10-Ply. Extra Heavy. Per Foot.
1 -inch \$0 09	3 -inch \$0 36	4-inch \$0 60	6-inch \$1 20
1 $\frac{1}{4}$ " 11	3 $\frac{1}{2}$ " 42	6 " 90	7 " 1 40
1 $\frac{1}{2}$ " 14	4 " 48	7 " 1 05	8 " 1 60
1 $\frac{3}{4}$ " 16	4 $\frac{1}{2}$ " 54	8 " 1 20	9 " 1 80
2 " 18	5 " 60	9 " 1 35	10 " 2 00
2 $\frac{1}{4}$ " 20	5 $\frac{1}{2}$ " 66	10 " 1 50	11 " 2 20
2 $\frac{1}{2}$ " 23	6 " 72	11 " 1 65	12 " 2 40
3 " 27	7 " 84	12 " 1 80	14 " 2 80
3 $\frac{1}{2}$ " 32	8 " 96	14 " 2 10	15 " 3 00
4 " 36	9 " 1 08	15 " 2 25	16 " 3 20
4 $\frac{1}{2}$ " 41	10 " 1 20	16 " 2 40	18 " 3 60
5 " 45	11 " 1 32	18 " 2 70	20 " 4 00
5 $\frac{1}{2}$ " 50	12 " 1 44	20 " 3 00	22 " 4 40
6 " 54	14 " 1 68	22 " 3 30	24 " 4 80
7 " 63	15 " 1 80	24 " 3 60	26 " 5 20
8 " 72	16 " 1 92	26 " 3 90	18 " 5 60
9 " 81	18 " 2 16	28 " 4 20	30 " 6 00
10 " 90	20 " 2 40	30 " 4 50	32 " 6 40
11 " 99	22 " 2 64	32 " 4 80	34 " 6 80
12 " 1 08	24 " 2 88	34 " 5 10	36 " 7 20
14 " 1 26		36 " 5 40	
15 " 1 35			
16 " 1 44			

OIL MILL NOTES.

COTTON SEED (Raw Material).

LINTERS (marketable product). HULLED SEED.

HULLS (marketable product). MEATS

CAKE OR MEAL (marketable product). OIL (marketable product).

THE PROCESS.

The process as now conducted in first-class mills is about as follows:

1. The seed are cleaned of sand.
2. Then the other foreign substances, such as bolls, pieces of wood, etc., are removed.
3. They are then carried to the Linters and reginned for a part of the short lint.
4. They are then carried to the Huller, which cuts them to pieces.
5. Then in a reel the meats are separated from the hulls.
6. The hulls are then taken out, heretofore to the fire room for fuel, but latterly to be sold as cattle feed.
7. The meats are taken to the Rolls which crushes them, breaking the oil cells.
8. From the Rolls the meats go to the Heaters in which they are cooked.
9. From the Heaters meats are taken into the Former where cakes are formed and enclosed in cloth.
10. The cakes are placed in the Press and the oil extracted by pressure.
11. The cake remaining in the Press is taken out, allowed to cool and it may be then cracked and ground into meal.

In linting seed once the weight of lint is about 36 pounds per ton of seed, in linting two or three times the weight is somewhat increased, but the total value of the different grades foots up to the same amount as in one linting.

One 106-saw Linter will lint from 16 to 24 tons of seed in 24 hours.

The Linter should not be adjusted to remove every particle of lint as this causes a dark sample, neither should there be too much lint left on the seed as it is thus partly waste.

Hulls should not be burned; but mixed with about 20 per cent of meal, packed in sacks and sold for cattle food. We have built and furnished to some of the most successful mills, a machine that can pack about 200 pounds of this mixture in a sack.

A 15-plate Press can be charged, by skilled hands, in about two minutes, in a six-press mill; the Presses should be run up about every 10 minutes; in a smaller mill not so often.

Dry cotton seed meats require from 12 to 18 minutes to cook in Heaters. Wet and frosted seed may take as long as 45 minutes.

The weight of oil, plus the weight of cake, multiplied by two, equals the weight of seed, in other words the hulls and lint weigh the same as the meats.

A gallon of cotton seed oil weighs $7\frac{1}{2}$ pounds.

400 tons on a 16-inch ram is enough pressure to apply to extract the oil from the cake.

OIL MILL NOTES (Continued).

Machine.	Speed.	Capacity in Tons Seed in 24 Hours.	Horse Power.
Sand and Boll Screen	20	40	3
Linter	350	5	4
Linter	350	10	3
Huller	900	40	10
Huller	900	100	25
Separating Screen	20	40	3
Rolls	180	40	10
Rolls	180	100	30
Heater	105	40	8
Heater	105	100	20
Capacity in Tons Product in 12 Hours			
Cake Cracker	300	25	5
Cake Cracker	300	65	12
Meal Mill	1800	25	25
Meal Mill	1200	65	50
Hull Press	400	40	5

For shafting, add 20 per cent. to power.

For conveyors and elevators, add 10 per cent. to power.

In some cases in the foregoing table, the machines are given two ratings in capacity and power. In the case of the Linters and Hullers, the variations may be made by varying the amount of material fed; in the case of the other machines, the variations are due to using different size machines for different capacities desired.

The capacities and corresponding power required, may be widely varied according to the way in which the machinery is forced, and according to the general skill in operating the mill as a whole.

The usual allowance of power for various size oil mills is 2½ horsepower per ton (of seed) capacity per day of 24 hours.

REFINING OIL.

The oil from the presses is allowed to settle and the top is drawn off. Settlings are called "foots."

It is next strained, heated, and either stirred by mechanical paddles, or has air blown through it from the bottom of tank by means of a perforated pipe.

A strong solution of caustic soda is added, the "soap stock" settles to bottom of tank, the oil is drawn off and washed with water which floats the oil and absorbs the soda. The oil is next filtered and is ready to ship as refined oil.

Refineries are usually built to refine 75 to 200 barrels per day. There are few instances of smaller refineries being successful, mainly because a skilled refiner cannot usually be employed for less than \$1,500 to \$2,500 per year, and the capacity of the refinery must be sufficient to justify this fixed charge.

An unskilled man might, by spoiling one or two "batches" of oil, cause more loss to a company in a day than could be repaired by profit in a year.

After knowledge, skill must be acquired by patient practice and close observation

FILTER PRESS.

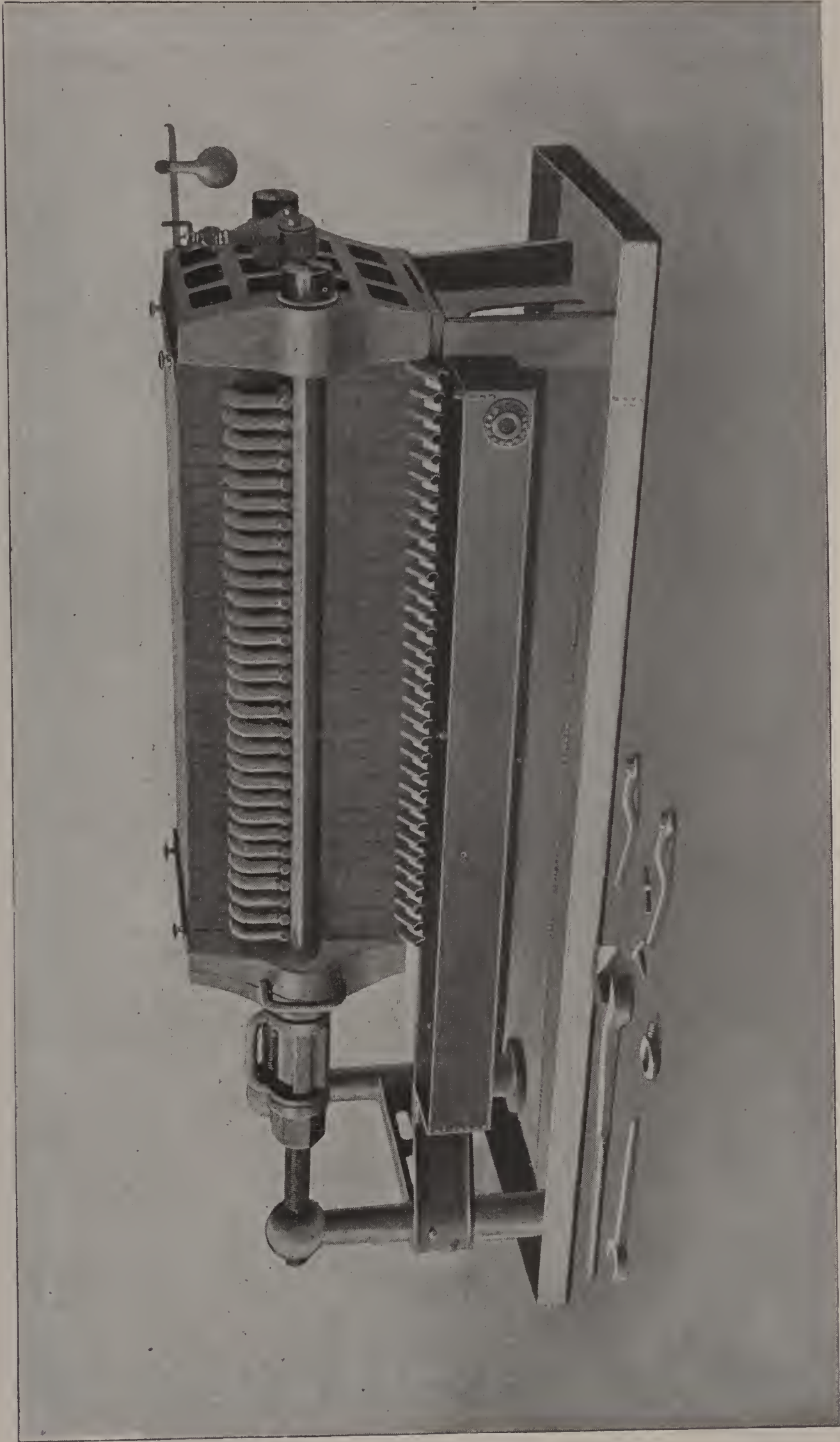


Figure 475.
Filter Press.
For prices and description see page 364

FILTER PRESSES (Continued).

Fig. 475.

PRICE LIST.

18-inch Square Plate Filter Press, with centre feed and centre screw, to be used in a 60-ton mill, frame complete (no pan)	\$200 00
Plates, each	10 00
Press usually made 10 to 24 plates.	
Bottom pan, extra	25 00
Cocks extra, each	30
24-inch Square Plate Press, centre and standard cotton oil press to be used in a 150-ton mill, frame complete with trough	\$250 00
Bottom pan, extra	50 00
Plates, each	12 50
Cocks, each	40

PRESS CLOTH.

FOR CRUDE OIL PRESSES.

Camels' Hair Cloth	Per pound, 45c to 60c
Woolen Cloth	" " 35c to 50c
Cotton Warp, Wool Filling	" " 25c to 40c
Cotton Cloth	" " 20c to 30c

FOR FILTER PRESSES.

Name of Cloth.	Price per yd. Cut.	Name of Cloth.	Price per yd. Cut.
No. 162	\$0 18	No. 232	95
Glencove	18	Mat	60
Oakdale	30	Lambskin	75
Heavy Oakdale	34	Napped Lambskin	75
X Heavy Oakdale	43	Chain	30
No. 182	32	Fine Chain	35
Cotton and Linen	25	X Chain	32
No. 2	60	XX Chain	35

The above prices are for cloth 30 inches wide. Other widths in proportion, except for Lambskin which are figured at rate of 70c for 20-inch widths, narrower than 30 inches.

Filter cloths are made in widths 16 inches to 42 inches.

A roll is 100 yards and these rolls are not cut except one roll is used to cut trial samples. Trial sample orders for less than a roll will be charged 10 per cent above the regular net price.

WAGON SCALES.

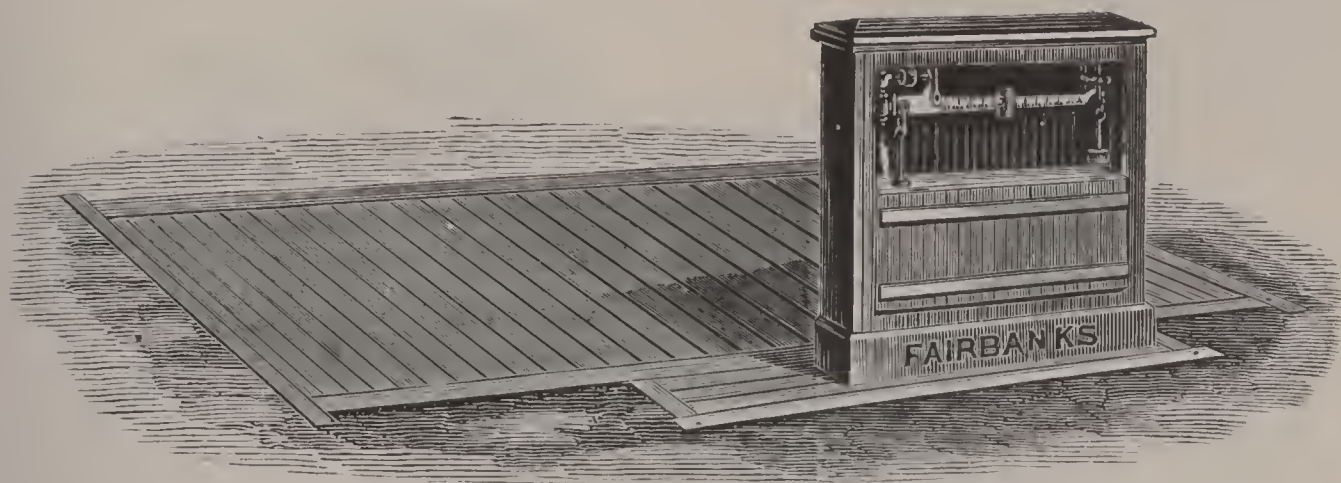


Figure 476.

These well-known Wagon Scales are not only made of the sizes and capacities shown, but the dimensions may be varied somewhat without adding to the cost of the Scale.

Special Scales can be adapted to special situations, and extension levers can be provided to carry the beam farther from the platform of the Scale, placing it in an office, if desired. The distance from the platform to the beam may be extended not exceeding 2 feet, without extra charge, longer extensions up to 20 feet being furnished at proportionate price.

All the prices are exclusive of timber and foundation, which are to be furnished by the purchaser.

Capacity, Tons.	Size of Platform.	Distance from Edge of Platform to Beam Rod.	Price Single Beam.	Price Double Beam.	Price Comp'd Beam.
20	22 x 7 ft. 2¾ in.	3 ft. 10 in.	\$520.00	\$535.00	\$550.00
15	22 x 7 " 2¾ "	3 " 10 "	420.00	435.00	450.00
10	22 x 10 " 3⅞ "	2 " 1 "	345.00	360.00	375.00
10	18 x 8 " 3 "	4 " 5½ "	330.00	345.00	360.00
8	18 x 8 " 3 "	4 " 5½ "	300.00	315.00	330.00
6	18 x 8 " 3 "	4 " 5½ "	275.00	290.00	305.00
15	14 x 8 " 4¼ "	2 " 1 "	390.00	405.00	420.00
12	14 x 8 " 4¼ "	2 " 1 "	320.00	335.00	350.00
10	14 x 8 " 4⅝ "	2 " 0¾ "	300.00	315.00	330.00
8	14 x 8 " 4⅝ "	2 " 0¾ "	275.00	290.00	305.00
6	14 x 8 " 4⅝ "	2 " 0¾ "	250.00	265.00	280.00
5	14 x 8 " 4¼ "	2 " 1 "	225.00	235.00	245.00
4	14 x 8 " 4¼ "	2 " 1 "	200.00	210.00	220.00
3	14 x 8 " 0¾ "	1 " 2⅛ "	175.00	185.00	195.00
6	22 x 8 "	2 " 9 "	250.00	265.00	280.00
6	14 x 8 "	2 " 2½ "	225.00	240.00	255.00
5	14 x 8 "	2 " 2½ "	200.00	210.00	220.00
4	14 x 8 "	2 " 2½ "	170.00	180.00	190.00
3	14 x 8 "	2 " 2½ "	145.00	155.00	165.00

PORTABLE SQUARE PLATFORM SCALES.

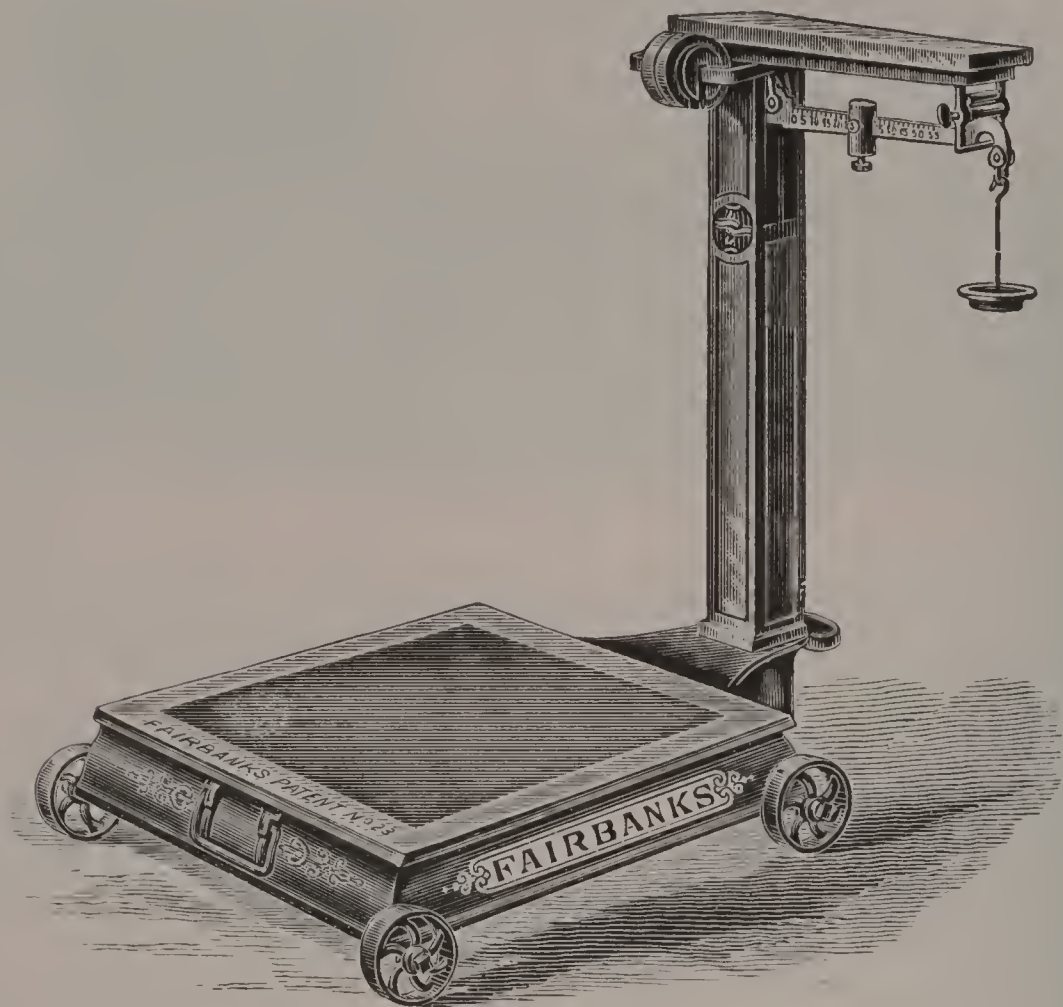


Figure 477.

The beams are graduated 100 pounds by $\frac{1}{2}$ -pound divisions, with the exception of the 600-pound size which is graduated 50 pounds by $\frac{1}{4}$ -pound divisions.

This shape of platform adapts the Scale for the weighing of more bulky goods than the common oblong pattern.

Scale may also be provided with Bag Rack at the additional price of \$3.50 for the 600-pound size, \$4.00 for the 1,000-pound and 1,200-pound sizes, \$4.50 for the 1,500-pound size, and \$5.00 for the 2,000-pound size.

Capacity. Lbs.	Platform. Inches.	With Wheels. Price.	Without Wheels. Price.
600 x $\frac{1}{4}$	23 x 23	\$35.00	\$32.00
1,000 x $\frac{1}{2}$	25 x 25	45.00	42.00
1,200 x $\frac{1}{2}$	27 x 27	53.00	50.00
1,500 x $\frac{1}{2}$	29 x 29	60.00	56.00
2,000 x $\frac{1}{2}$	31 x 31	80.00	75.00

IRON FRAME RAILWAY TRACK SCALES.

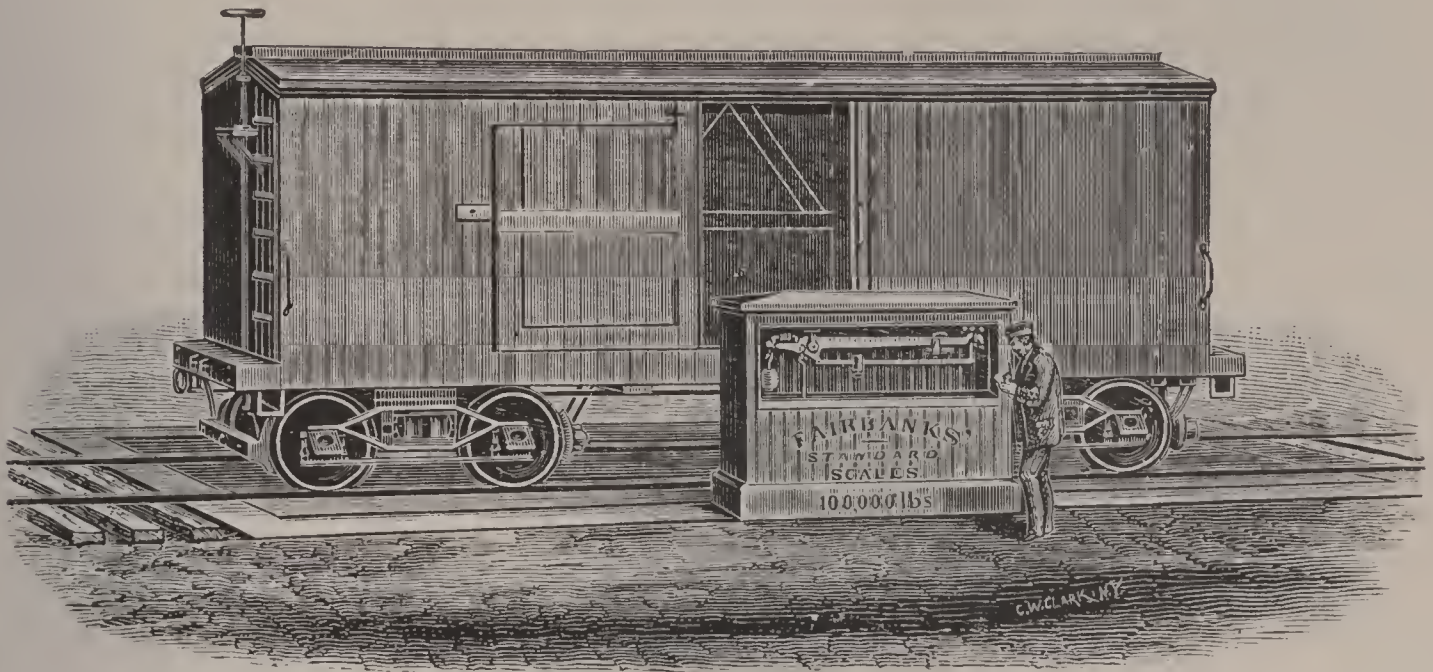


Figure 478.

These Scales are constructed upon a unique principle, and embody many valuable improvements. They are everywhere known as very durable, accurate and well adapted for railway use. They are made to suit any gauge of track, but if no other is specified the standard gauge of 4 ft. 8½ in. will be understood to be desired. They may be framed entirely of steel instead of timber, making weighing machines especially suitable for use in hot climates and other localities.

The suspension form of Track Scale is especially durable, and for many situations in low and wet ground it is the most desirable pattern for meeting the requirements successfully. The mechanism of the Scale is above and out of the way of all moisture and dust, and as the platform is suspended there is less wear on the bearings under these conditions. The Scale may be protected by a light roof overhead or by a more substantial building erected for it. This pattern may also be built entirely of steel instead of timber.

Track Scales of all patterns are usually fitted with improved beams of the single beam pattern, but double, triple, or gridiron beams can be furnished.

Type Registering Beams can be furnished if desired. Prices upon application.

COTTON GINNING.

All buildings for ginning plants should be constructed under the Rules of the New England Mutual Insurance Companies for cotton factories. Cotton factory insurance is reduced to one-half of one per cent. Ginnery insurance has been heretofore six to ten per cent. The rate of insurance and fire hazard together makes gin property an exceedingly insecure investment, in fact almost the equivalent of an expense item.

We are prepared to furnish complete designs for ginneries or for combined ginneries and cotton seed oil mills, on which reasonable rates of insurance can be procured, as follows:

DRAWINGS AND SPECIFICATIONS FOR OIL MILLS AND GINNERIES.

4-Gin Ginneries	\$ 150 00
6 " "	200 00
8 " "	300 00
12 " "	400 00
20-Ton Oil Mill	300 00
30 " "	400 00
60 " "	800 00
100 " "	1,000 00

APPLIANCES FOR HANDLING SEED COTTON.

Head for spiked elevator, 14-inch wide pulley	\$60 00
Boot for spiked belt elevator	40 00
Head and hopper for spiked belt distributor	60 00
Tail for spiked belt distributor	40 00
Wood Elbows—square opening, back side tin lined, 9-inch	3 00
Wood Elbows, 12-inch	4 00
Telescope Pipes, 9-inch	10 00
Telescope Pipes, 12-inch	15 00
Separator, 3 gins	65 00
Separator, 3 or 4 gins	75 00

For Suction Fans see page 370.

The cost of ginning cotton on plantations with slave labor and mule power was practically nothing.

The average cost of ginning cotton by the means commonly employed in the last 15 years has not averaged less than \$2.50 per bale, and the fire risk has been rated at 6 to 10 per cent on plants.

The cost of ginning the Southern crop should not exceed 75 cents per bale, and the insurance rate on ginning plants should not exceed 1 per cent, and we believe it will ultimately not exceed 1/2 of 1 per cent, as has been done in cotton factories.

COTTON GINNING (Continued).

CONDENSED PRICE LIST OF MUNGER PATENT COTTON GINNING MACHINERY.

Cotton Gins, per Saw, 10-inch	\$ 3 50
Cotton Gins, per Saw, Huller 12-inch	4 50
Feeders, per saw	1 00
Condenser, per saw	1 00
Lint Flue System, two 70-saw gins	120 00
“ “ “ three 70-saw gins	150 00
“ “ “ four 70-saw gins	180 00
“ “ “ five 70-saw gins	210 00
Revolving Double Box Press, screw power	350 00
“ “ “ “ hydraulic power	425 00
“ “ “ “ steam cylinder	500 00
“ “ “ “ without power	225 00
Self Packer, 10-inch	150 00
Self Packer, 12-inch	165 00
Steam Fittings for Packer	20 00

SUCTION ELEVATOR AND CLEANER.

Class B, with Distributer.

Twenty Bale (9-inch) Elevator with Distributer, 2 Gins	\$276 00
Thirty Bale (10½-inch) Elevator with Distributer, 3 Gins	349 00
Forty Bale (11-inch) Elevator with Distributer, 4 Gins	430 00

SEED CONVEYOR AND BLOWER.

Used in Connection with our Cotton Elevator, with Elbows and Piping.

For two Gins	\$140 00
For three Gins	180 00
For four Gins	220 00
For five Gins	260 00
Ginner's Chest of Tools	40 00
Gin Saw Sharpener	15 00

Gin Book: No. 1, \$1.00; No. 2, \$1.50.

Price 2 Gin Outfit (70-saw) complete	\$2,210 00
“ 3 “ “ “ “	2,833 00
“ 4 “ “ “ “	3,476 00
“ 2 “ “ (60-saw) “	2,100 00
“ 3 “ “ “ “	2,668 00
“ 4 “ “ “ “	3,256 00

FANS.

PATENT STEEL EXHAUST FAN.

Specially Constructed for Elevating Seed Cotton, Cotton Seed, Hulls, etc.

SHELLS, WHEELS AND SHAFTS OF STEEL.

The bearings are both on one side, the object being that the inlet may be entirely unobstructed, so as to allow free ingress for the cotton or other fibrous material. The blast wheels in these Exhausters are so constructed that there is no opportunity for the catching or lodging of cotton and consequent clogging of the machine.

Parties ordering Exhaust Fans, should state in all cases whether right or left hand is wanted. In cases where it makes no difference which hand is sent, it should be so stated in the order. By right hand is meant pulley on the right hand side as you stand facing the outlet, and by left hand, pulley on left hand side.

The "Revolutions per Minute" given in the following table are intended as the lowest and highest speeds required.

The speed must be gauged by the length of pipes, number of turns, and strength of suction required.

PRICES, DIMENSIONS, SPEED, ETC.

Size.	Price.	Height of Shell.	Diameter of Inlet.	Diameter of Outlet.	Diameter and Face of Pulleys.	Revolutions per Minute.
30 inch.	\$ 44 00	30 inches.	11¼ inches.	11¼ inches.	5¼ x 4½	1,500 to 2,100
35 "	55 00	35 "	13¼ "	13¼ "	6 x 5½	1,250 to 1,800
40 "	70 00	40 "	15 "	15 "	6½ x 6½	1,000 to 1,500
50 "	90 00	50 "	19 "	19 "	8½ x 7½	850 to 1,200
60 "	115 00	60 "	22½ "	22½ "	10¼ x 9½	750 to 1,000
70 "	150 00	70 "	26 "	26 "	12 x 9½	650 to 850
80 "	200 00	80 "	30 "	30 "	14 x 12½	550 to 750

COTTON PRESSES AND GINS.

COTTON PRESSES.

	Price.	Weight.
Boss	\$190 00	4,535
Boss Down Packing	200 00	4,350
Boss No. 2	175 00	2,240
Boss No. 3	250 00	4,750
Graveley	130 00	3,800
Liddell Hand Press	125 00	2,335
Liddell Direct-Acting Steam Press, No. 1	500 00	8,500
Liddell Direct-Acting Steam Press, No. 2	450 00	9,000
Daisy Yarn and Warp Press	150 00	2,500

COTTON GINS.

Number of Saws	50	60	70	80
Weight of Gins	1,050	1,100	1,200	1,300
Weight of Feeder	515	575	625	640
Weight of Condensers	340	380	400	455

PRICE OF ALL GINS.

Price per saw, Gins	\$3 00
" " " Feeder	1 00
" " " Condenser	1 00

FANS, SEPARATORS,

And Parts Necessary to make up a Complete Suction Cotton Elevator Equipment,

AND

MECHANICAL DISTRIBUTER, Thomas System.

No. 9 Fan, suitable for 1 and 2-gin outfit, speed 1,600 to 2,500, pipe 9 inches,	\$ 55 00
No. 12 Fan, suitable for 3 and 4-gin outfit, speed 1,300 to 2,300, pipe 12 inches,	75 00
Separator for 1 and 2-gin outfit	65 00
Separator for 3 and 4-gin outfit	75 00
Fan and Cut-Off combined	120 00
Fan and Cut-Off combined	140 00
Black Pipe, 9-inch, per foot	35
Black Pipe, 12-inch, per foot	50
Galvanized Pipe, 9-inch, per foot	50

DISTRIBUTERS.

14-foot long for two 60-saw gins	\$ 75 00
18-foot long for three 60-saw gins	85 00
24-foot long for four 60-saw gins	100 00
16-foot long for two 80-saw gins	80 00
24-foot long for three 80-saw gins	100 00
32-foot long for four 80-saw gins	120 00

For each additional foot wanted add \$2.50 per foot.

This to be regulated somewhat as to distance of gins apart. Takes but little power to run; should run 150 to 200 revolutions; will have pulley 16-inch diameter, with 4, 5 or 6-inch face, according to length of distributor.

Should you wish to make your own pipe of wood, the 9-inch round pipe is equal to an 8-inch square opening, the 12-inch round to a 10¾ opening. We will sell the Telescope-pipe and necessary Elbows as listed. Our patent covers the process of blowing the seed after ginning to storage-house away from gin-house, the seed-belt carrying direct into discharge-flue of the fan. We are prepared to make estimates on special jobs with this attachment or for distributing from Separator to stalls or gin-stands as desired.

LABOR-SAVING APPLIANCES FOR HANDLING SEED COTTON.

Galvanized Pipe, 12-inch, per foot	\$ 0 75
Round Elbows, 9-inch, Black Iron	3 00
“ “ 12-inch, Black Iron	4 00
“ “ 9-inch, Galvanized Iron, each	4 00
“ “ 12-inch, Galvanized Iron, each	5 00
Tees, 9-inch, Black Iron, each	90
“ 12-inch, Black Iron, each	1 20
“ 9-inch, Galvanized Iron, each	1 50
“ 12-inch, Galvanized Iron, each	2 25
Y, with valve, 9-inch, each	6 50
Y, with valve, 12-inch, each	8 00
Breeches, with valve, 9-inch, each	6 50
Breeches, with valve, 12-inch, each	8 00
Telescope, 9-inch, when out full length, 20 ft. long, galvanized iron . . .	10 00
“ Fixtures for 9-inch	6 00
“ 12-inch, when out full length, 20 ft. long, galvanized iron . . .	15 00
“ Fixtures for 12-inch	7 00

Shorter or longer lengths charged or credited in proportion.

GINS.

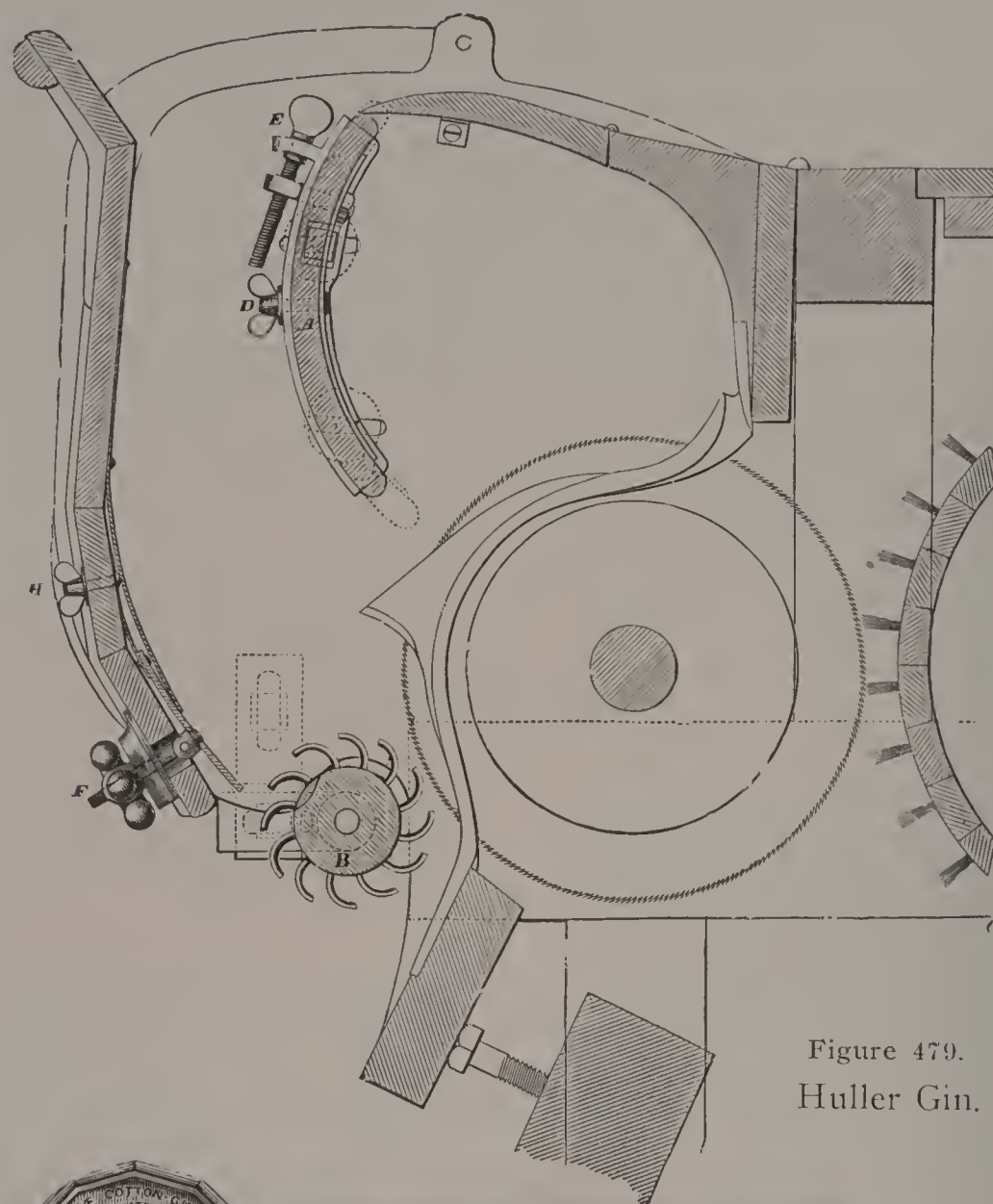


Figure 479.
Huller Gin.

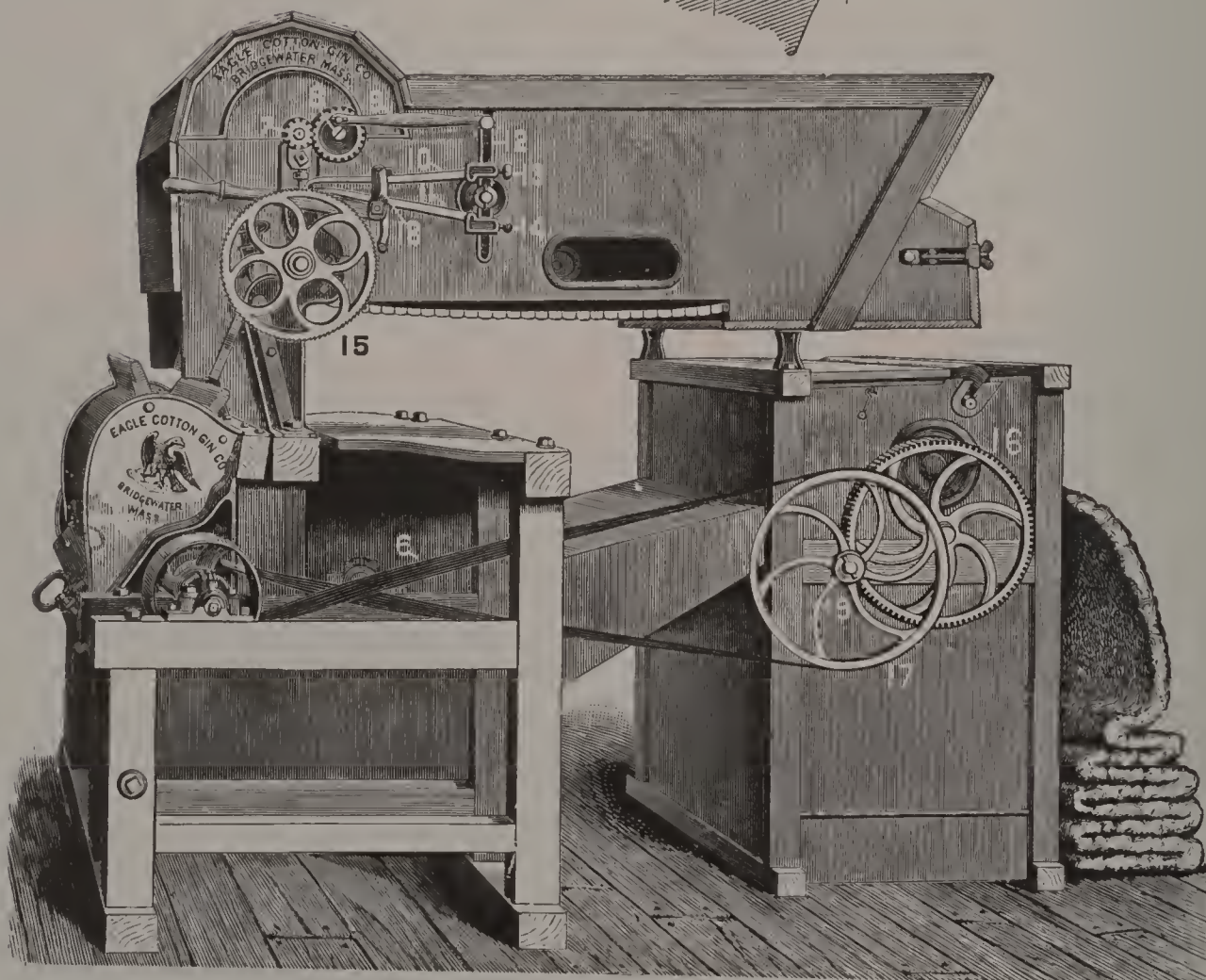


Figure 480.
Saw Gin and Condenser.

GINS (Continued).

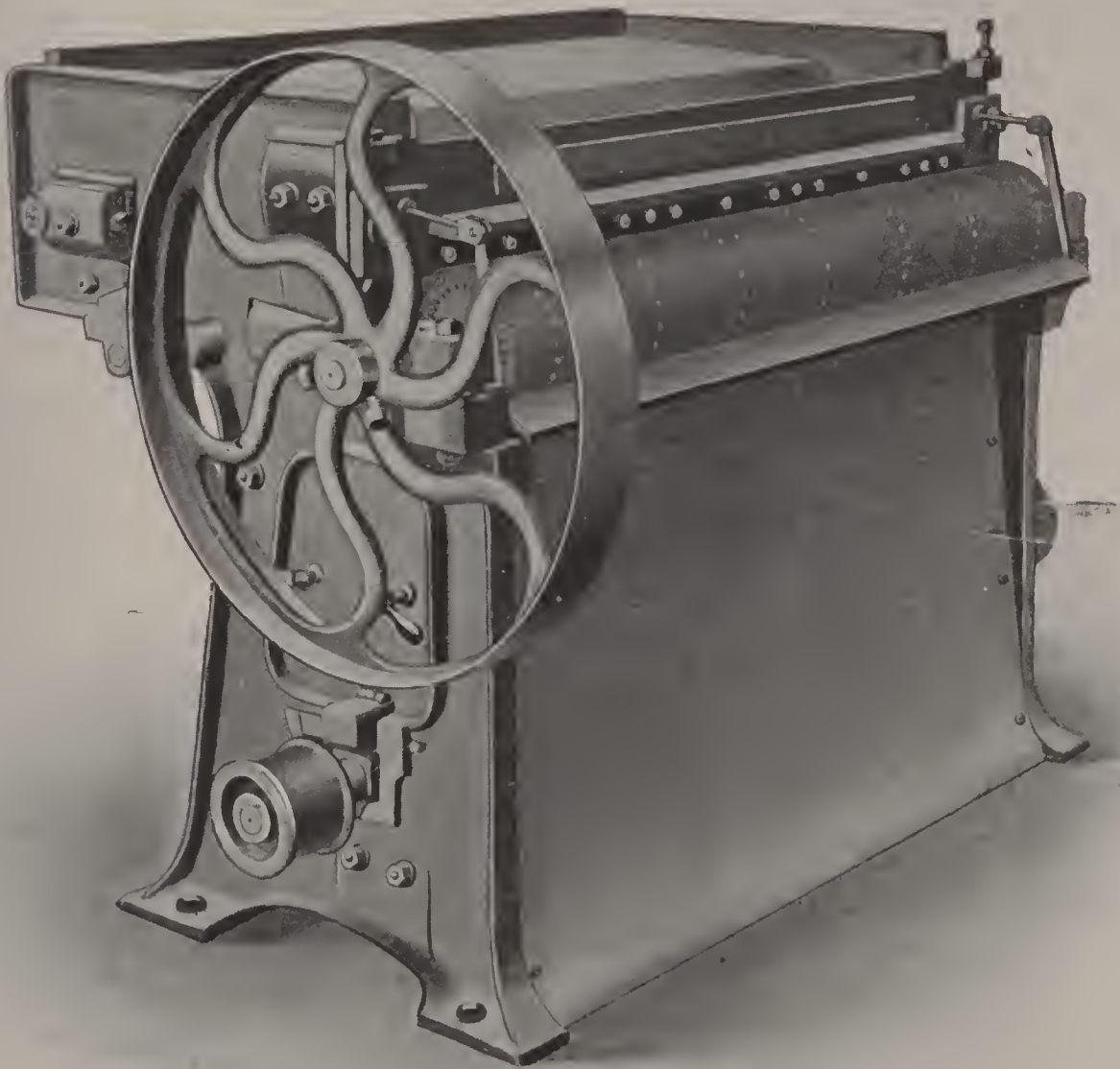


Figure 481.

No. 1 Roller Gin for Long Staple Cotton.

Capacity 2 bales in 10 hours.

Made in our shop.

GINS (Continued).

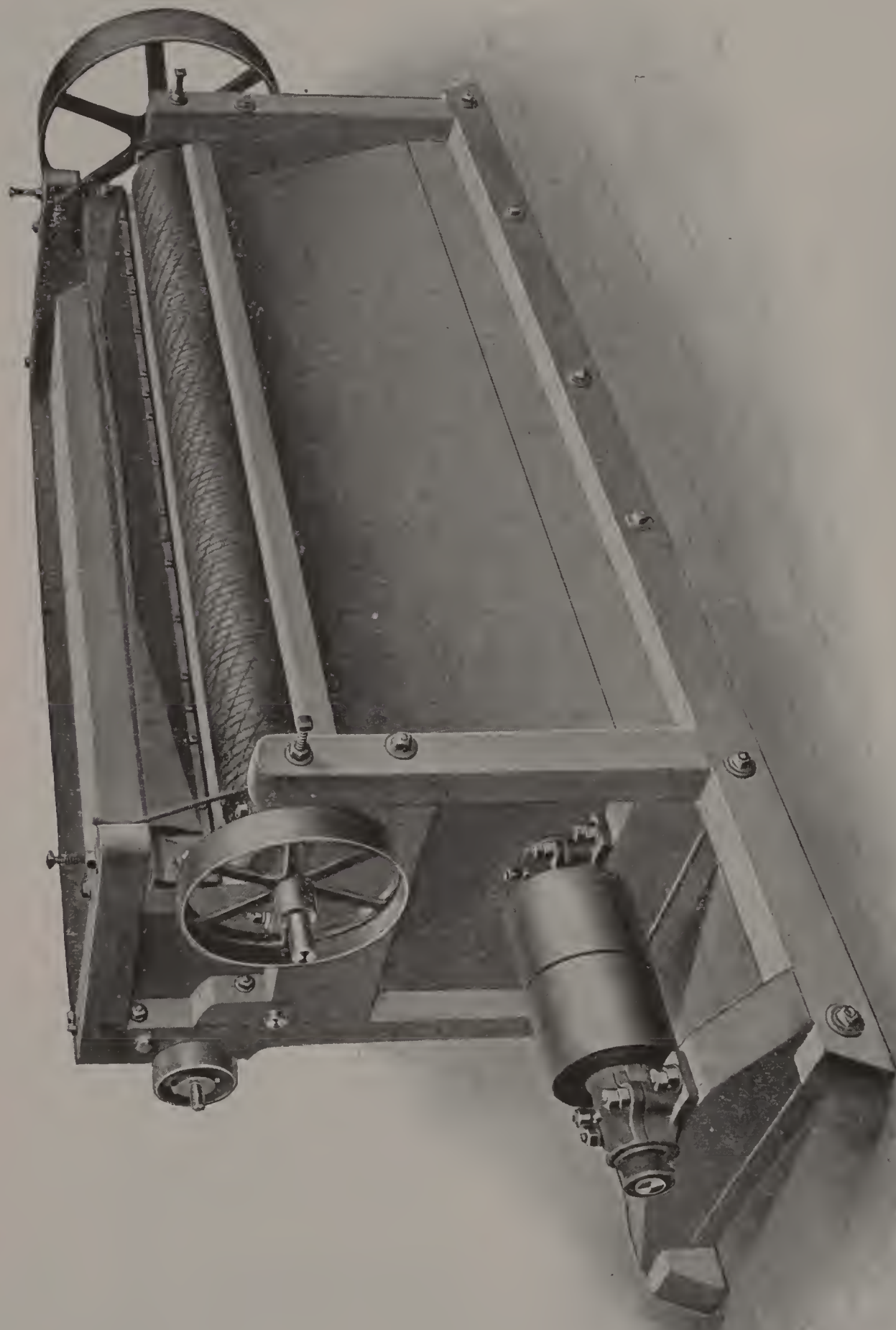


Figure 482.
No. 2 Roller Gin for Long Staple Cotton.
Capacity 3 bales in 10 hours.
Made in our shop.

THE D. A. TOMPKINS CO.,

CHARLOTTE, N. C.

ELECTRICAL EQUIPMENT AND SUPPLIES.

Generators

Motors, Arc and

Incandescent

Light Switch-

boards and Elec-

trical Supplies

We Install Complete Electric
Lighting and Power Plants.

We carry a large stock of Electrical Supplies.



Figure 483.

A Corner of our Electrical Department.

WE CARRY A LARGE STOCK OF

Incandescent Lamps,	Slow Burning
Enclosed Arc Lamps,	Weatherproof Wire,
Inner Globes for	Rubber Covered Wire,
Enclosed Arc Lamps,	Annunciator Wire,
Arc Lamp Carbons,	Sockets, Rosettes,
Plug Cut Outs,	Knife Switches unmounted and
Fuse Plugs, Fuse Wire,	On Marble Base,
D. & W. Cartridge,	Snap Switches,
Cut Outs and Fuses,	Carbon Brushes,
Fuse Links,	Snap Switches,
Porcelain Cleats,	Circular Loom Conduit,
Porcelain Knobs,	Shade Holders,
Porcelain Tubes,	Lamp Guards,
Porcelain Shades,	Friction Tape,
Tin Shades,	Shade Holders,
Carbon Cylinder Batteries,	Electric Bells,
Edison Lalonde Batteries,	Push Buttons,
Sampson Batteries, Solder,	Electric Gas,
Soldering Paste, Annunciators,	Lighting Supplies,
Speaking Tube Supplies,	Electric Fans,
and other Electrical Supplies.	

Orders receive prompt attention.

ELECTRIC UNITS.

Volt.—The unit of electric pressure is called the Volt. It is analogous to steam pressure, or to head of water. We speak of an electric pressure of so many volts as we speak of a steam pressure of so many pounds to the square inch, or to a head of water of so many feet. One Daniell's cell gives a pressure of nearly one volt.

Coulomb.—Is a fixed unit of quantity of electricity, just as a gallon is fixed unit of a quantity of water.

Ampere.—Is rate of flow of electricity. Just as water may be flowing at the rate of so many gallons per second, so electricity flows at the rate of so many amperes per second.

One coulomb passing in one second is one ampere.

Ohm.—Is unit of electrical resistance in conductors, as friction is resistance of water in pipes.

The unit of resistance most generally used is the Paris or legal Ohm, which is the resistance of pure mercury of one square millimetre cross section and 106 centimetres in length at a temperature 0 degree, C.

$Joule = Volt \times Coulomb$.

Work done in increasing the voltage of a fixed quantity of electricity, as energy is required to increase pressure of air.

$Watt = Volt \times Ampere$.

One coulomb per second is one ampere. One volt coulomb per second = one joule or one volt $\times$ ampere per second = one watt which is work or power, just as we speak of the horsepower of an engine.

Horsepowers and watts are convertible terms.

1 watt = .0013406 horsepower.

1 horsepower = 745.941 watts (volt-amperes per second).

The longest lived lamp is not necessarily the most economical; they may require too much coal to incandesce them, and they may blacken and not furnish good light.

Three things must be considered in the economy of lamps. 1. Length of life; 2. Power to incandesce; 3. Quality of light. Or in different language, 1. They must live 600 to 1,200 hours; 2. One horsepower must incandesce 10 to 12, 16 c. p. lamps; 3. The lamp must not blacken, but must continue to give 16 c. p. throughout its whole life.

Electric current is now sold for power purposes either by the H. P. or by the K. W. hour. The price generally ranges from \$15.00 per horsepower per year for 12 hours per day run, to \$25.00 per year where the power is obtained from water and in quantities of 100 H. P. and upwards.

This is approximately $\frac{3}{4}$ cent per K. W. hour to about $1\frac{1}{4}$ cents per K. W. hour meter measure.

Where the power is by steam and the distribution considerable, as is usual in a city, prices range from \$40.00 to \$150.00 per H. P. per year; or from 3 cents per K. W. hour to 6 cents per K. W. hour.

For lighting current is sold at 4 cents to 12 cents per K. W. hour.

Sometimes, in absence of a meter, flat rates vary from 25 cents to \$1.00 per 16 c. p. lamp per month.

For practical purposes horsepower and kilowatts may be converted on basis of following values:

1 K. W. = $1\frac{1}{3}$ H. P.

1 H. P. = 746 Watts.

1 H. P. = $\frac{3}{4}$ K. W.

1 K. W. = 1,000 Watts.

1 16-c. p. incandescent lamp at $3\frac{1}{2}$ watts per candle power = 56 watts.

1 500 to 1,000-c. p. arc light, 5 amperes, 125 volts = 625 watts, or at 110 volts = 550 watts.

POWER TRANSMISSION.

Rough Estimate of Cost of Transmission of Power on a Large Scale and for Long Distances.

Cost of Dam, say,	\$20 00 per H. P.
“ “ Wheels	10 00 per H. P.
“ “ Generators	15 00 per H. P.
“ “ Transformers	5 00 per H. P.
“ “ Motors	15 00 per H. P.
Pole, line and wire extra.	

The above figures are only the roughest approximations and are only put down so that one interested may have an approximate idea as to what it would cost to develop and transmit the power from a waterfall. Each item may vary greatly in any one actual case.

ELECTRIC RAILWAYS.

Rails commonly used, 60 pounds per yard. Tons per mile, single track, 100.	
Cost of Rails per mile, laid, delivered, including chairs and splices, etc.	\$9,000 00
Poles, per mile, 120. Delivered and set up at \$5.00 each	600 00
Overhead wire, per mile, delivered and put up, including all fixtures	1,000 00
Cross ties, per mile	1,000 00
Cars, each	\$1,000.00 and upwards
Trucks	250 00
Good car and truck, say	1,500 00

Estimate of cost of an entire Railway Plant having 100 H. P. Generator, Engine and Boiler, and six miles track, but no paving:

Building, say	\$ 15,000 00
100 H. P. Steam plant, delivered and set up	7,500 00
100 H. P. Generator, etc.	5,000 00
6 miles track	30,000 00
6 miles poles	3,600 00
6 miles wire	6,000 00
6 miles cross ties	6,000 00
6 cars and trucks	9,000 00

Total \$ 82,100 00

This estimate is based entirely on maximum figures. For example, instead of 60 pounds per yard rail as estimated, it is very common to use 35, 40 and 45 pounds per yard rail. Other items of estimate may be reduced proportionately in similar manner. Where streets are to be paved cost of paving must be considered.

ELECTRIC POWER TRANSMISSION.

For short distances and for all ordinary purposes, power may be transmitted say $\frac{1}{4}$ to $\frac{1}{2}$ mile by means of ordinary direct current dynamos, such as are used for isolated incandescent lighting. Usually the capacity of the machines are rated as being about 10 lights per horsepower. Therefore, 100-light dynamos would generate current for or deliver at the belt about 10 horsepower. These machines work well, and are entirely practicable at, say, distances of half a mile or less.

For greater distances than $\frac{1}{2}$ mile it is necessary to use a higher voltage or pressure. Direct currents could be used at 500 volts as is done in the railway system. In all cases within the knowledge of the writer, the successful electrical railways have used 500 volts. Many railways have been constructed in which cars have been operated about 10 miles away from the generating station.

The machines now made for railway purposes could as well be used for generation, transmission and development of power for other purposes than railways.

The alternating current is, however, for most purposes, the most economical method of transmission of power by electricity. One of the principal objections to the direct current is that for distances greater than 10 miles the necessary voltage for economical work makes the current a dangerous one. With the alternating current this is overcome as follows:

A generator can be used in which the current is generated at, say, 100 volts. This current may then be converted to even as much as 10,000 volts, at which great pressure it may be conveyed a great distance (say 100 miles), over a very small wire; then reconverted to as low a pressure as it is desired to use it. Thus the very great pressure necessary to convey a larger power great distances over a small wire is only on the transmission wire, and not in the generating nor in the developing machinery, and the danger attending very high pressure currents is thereby eliminated at each end of the line.

By alternating current apparatus 100 H. P. was transmitted 100 miles to the Frankfort exposition. In many instances in this country power has been successfully transmitted 20 to 50 miles and over.



GENERATORS AND MOTORS.

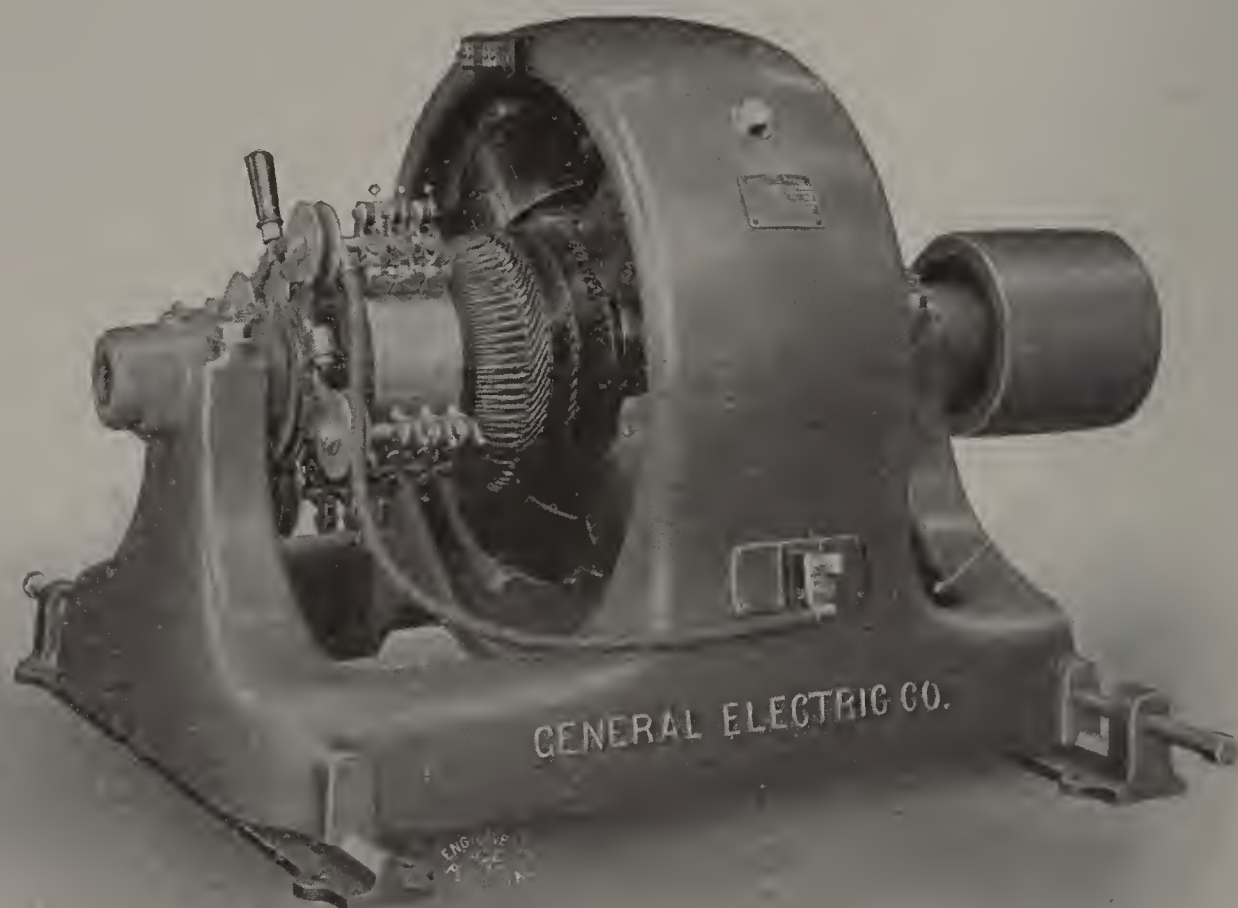


Figure 484.
Standard and Slow Speed, Shunt or Compound Wound.
Direct Current 125, 250 and 500 volts.

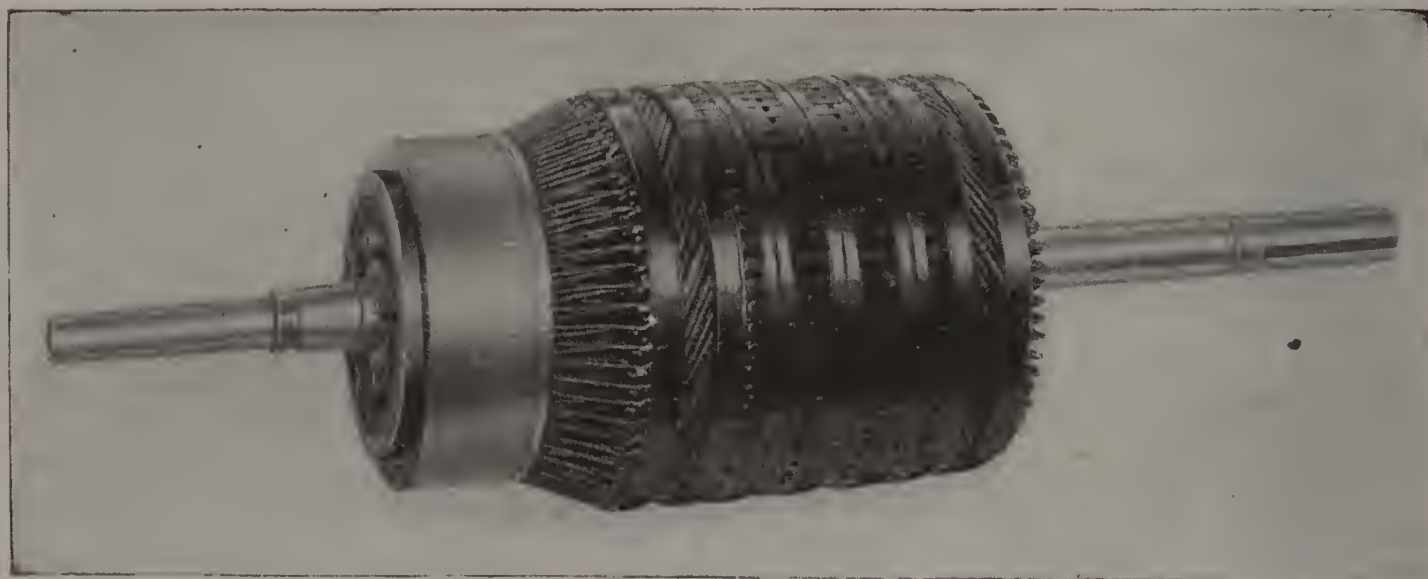


Figure 485.
Armature.

STANDARD SPEED GENERATORS.

CLASSIFICATION.						WEIGHT.		PULLEY.	
Type.	Poles.	KW.	Speed.	Volts Full Load.	Amperes Full Load.	With Rails.	Without Rails.	Dia.	Face.
MP	4	9	1450	125-250-500	72- 36- 18	1030	970	9½	4¾
MP	4	12.5	1350	125-250-500	100- 50- 25	1435	1350	10	6½
MP	4	17.5	1175	125-250-500	140- 70- 35	1900	1810	11½	8¾
MP	4	25	1100	125-250-500	200-100- 50	2665	2565	12½	9
MP	4	30	1050	125-250-500	240-120- 60	3350	3200	13	11
MP	4	45	975	125-250-500	360-180- 90	4935	4780	16¾	13
MP	4	55	925	125-250-500	440-220-110	5690	5520	17¾	16¾
MP	4	65	875	125-250-500	520-260-130	7140	6930	18¾	19½
MP	4	85	750	125-250-500	680-340-170	8800	8560	21¾	24

SLOW SPEED GENERATORS.

CLASSIFICATION.						WEIGHT.		PULLEY.	
Type.	Poles.	KW.	Speed.	Volts Full Load.	Amperes Full Load.	With Rails.	Without Rails.	Dia	Face.
MP	4	6.5	950	125-250-500	52- 26- 13	1030	970	11	4¼
MP	4	9	900	125-250-500	72- 36- 18	1435	1350	11½	6½
MP	4	13.5	850	125-250-500	108- 54- 27	1900	1810	12¼	8½
MP	4	17	750	125-250-500	136- 68- 34	2665	2565	13¾	8½
MP	4	20	700	125-250-500	160- 80- 40	3350	3200	15	10½
MP	4	30	675	125-250-500	240-120- 60	4935	4780	20½	11
MP	4	40	605	125-250-500	320-160- 80	5690	5520	22¾	15½
MP	4	50	600	125-250-500	400-200 100	7140	6930	23	18½
MP	4	75	550	125-250-500	600-300-150	8800	8560	25	24½

STANDARD SPEED MOTORS.

CLASSIFICATION.						NET WEIGHT LBS.		PULLEY.	
Type.	Poles.	H. P.	Speed.		Form.	With Rails.	Without Rails.	Dia.	Face.
			Volts.						
			*125	110-220					
MP	4	20	1100	1025	H	1900	1810	10½	9¼
MP	4	30	1050	975	H	2665	2565	11	10
MP	4	35	975	910	H	3350	3200	11¾	11¼
MP	4	50	900	840	H	4935	4780	14¾	13¾
MP	4	65	850	790	H	5690	5520	15¾	16¾
MP	4	75	800	745	H	7140	6930	16¾	18¾
MP	4	95	700	655	H	8800	8560	19¼	23

*Same Speed for 250 and 500 Volts.

SLOW SPEED MOTORS.

CLASSIFICATION.						NET WEIGHT LBS.		PULLEY.	
Type.	Poles.	H. P.	Speed.		Form.	With Rails.	Without Rails.	Dia.	Face.
			Volts.						
			*125	110-220					
MP	4	15	800	745	H	1900	1810	9½	9½
MP	4	20	700	650	H	2665	2565	11	10
MP	4	25	650	610	H	3350	3200	11¾	11¾
MP	4	35	600	560	H	4935	4780	17¼	12¾
MP	4	50	550	515	H	5690	5520	18¾	17¼
MP	4	60	550	515	H	7140	6930	18¾	20
MP	4	85	500	470	H	8800	8560	20¾	24

*Same Speed for 250 and 500 Volts.

GENERATORS AND MOTORS (Continued).

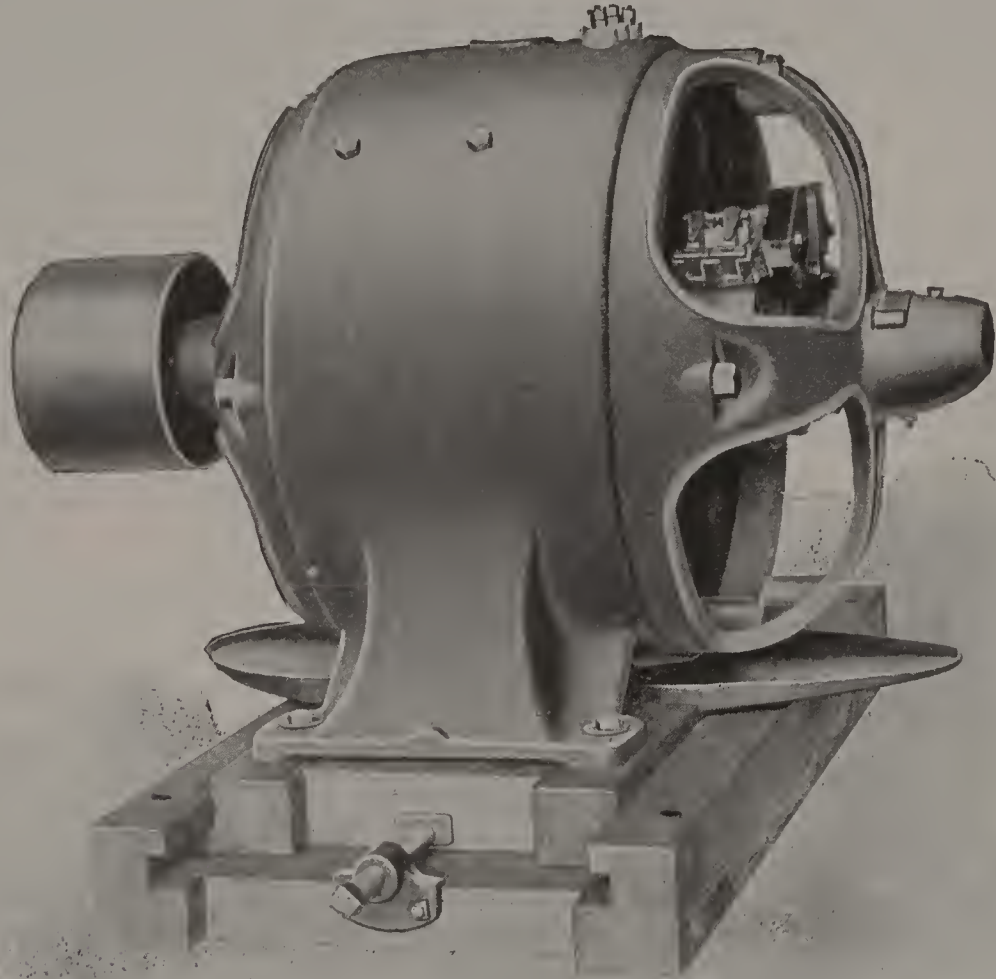


Figure 486.

Type of Generators and Motors on Wooden Sliding Base Frame with Drip Pan.
Direct Current, Shunt or Compound Wound.

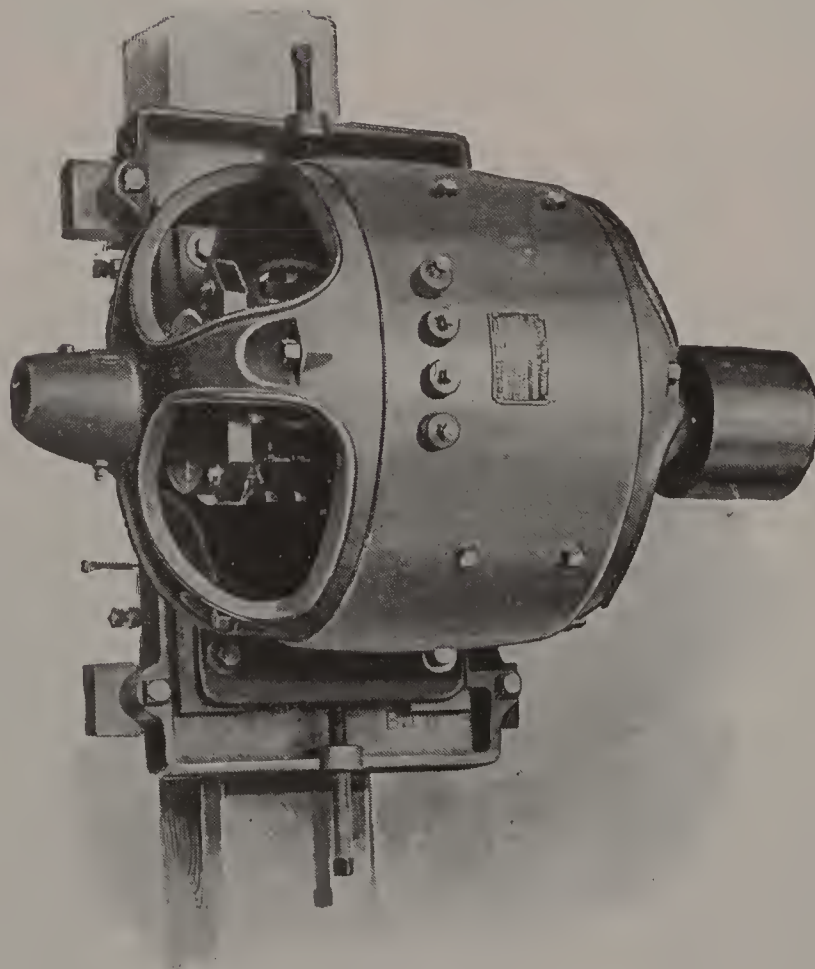


Figure 487.

Direct Current Generators and Motors to suspend from ceilings or on posts or walls.

GENERATORS.

CLASSIFICATION (COMPOUND WOUND)											Weight.	PULLEY.	
Type.	Poles.	K W.	Speed.	No Load Volt'ge	Full Load Volt'ge	Amp.	Speed.	No Load Volt'ge	Full Load Volt'ge	Amp.		Dia.	Face.
CE	2	1½	1350	120	125	12	1350	240	250	6	345	5	4
CE	2	2¼	2100	120	125	18	2100	240	250	9			
CE	2	2¼	1350	120	125	18	1350	240	250	9	455	5	4½
CE	2	3¾	2100	120	125	30	2100	240	250	15			
CE	2	3¾	1350	120	125	30	1350	240	250	15	630	5	4½
CE	2	5½	1875	120	125	44	1875	240	250	22			
CE	4	5½	1050	120	125	44	1050	240	250	22	870	7¾	6
CE	4	7½	1625	120	125	60	1775	240	250	30			
CE	4	7½	850	120	125	60	850	240	250	30	1240	9¾	7
CE	4	11	1300	120	125	88	1425	240	250	44			
CE	4	11	850	120	125	88	850	240	250	44	1660	10	8½
CE	4	15	1300	120	125	120	1300	240	250	60			

MOTORS.

CLASSIFICATION.						Weight.	PULLEY.	
Type.	Poles.	H. P.	SPEED.				Dia.	Face.
			115V	230V.	500V.			
CA	2	$\frac{1}{10}$	1500	1500	.....	21	2	$\frac{3}{8}$
CA	2	$\frac{1}{8}$	2300	2300	2500	32	$2\frac{3}{4}$	$1\frac{3}{4}$
CA	2	$\frac{1}{4}$	1650	1650	1800	$86\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{1}{2}$
CA	2	$\frac{1}{2}$	1200	1400	1700	135	$3\frac{3}{4}$	3
CA	2	$\frac{3}{4}$	1800	1800	2000	140		
CA	2	1	1100	1100	1300	208	$4\frac{1}{2}$	$3\frac{1}{2}$
CA	2	2	1800	1800	2000	213		

MOTORS (Continued).

CLASSIFICATION.										Weight.	PULLEY.	
Type.	Poles.	H. P.	SPEED (SHUNT WOUND MOTORS.)								Dia.	Face.
			110 V	115 V	125 V	220 V	230 V	250 V	500 V			
CE	2	2	1000	1025	1075	1000	1025	1075	1200	335	5	4
CE	2	3	1700	1750	1840	1700	1750	1840	1800			
CE	4	3	1000	1025	1075	1000	1025	1075	1200	465	5	4½
CE	4	5	1680	1725	1820	1680	1725	1820	1800			
CE	4	5	975	1000	1050	975	1000	1050	1200	540	5	4½
CE	4	7.5	1490	1525	1600	1490	1525	1600	1650			
CE	4	7.5	795	815	860	795	815	860	1000	800	7¾	6
CE	4	10	1220	1250	1310	1335	1375	1440	1500			
CE	4	10	635	650	685	635	650	685	800	1150	9¾	7
CE	4	15	975	1000	1050	1070	1100	1150	1200			
CE	4	15	665	690	750	665	690	750	750	1400	10	8½
CE	4	20	1000	1040	1125	1000	1040	1125	1125			



MOTORS (Continued).

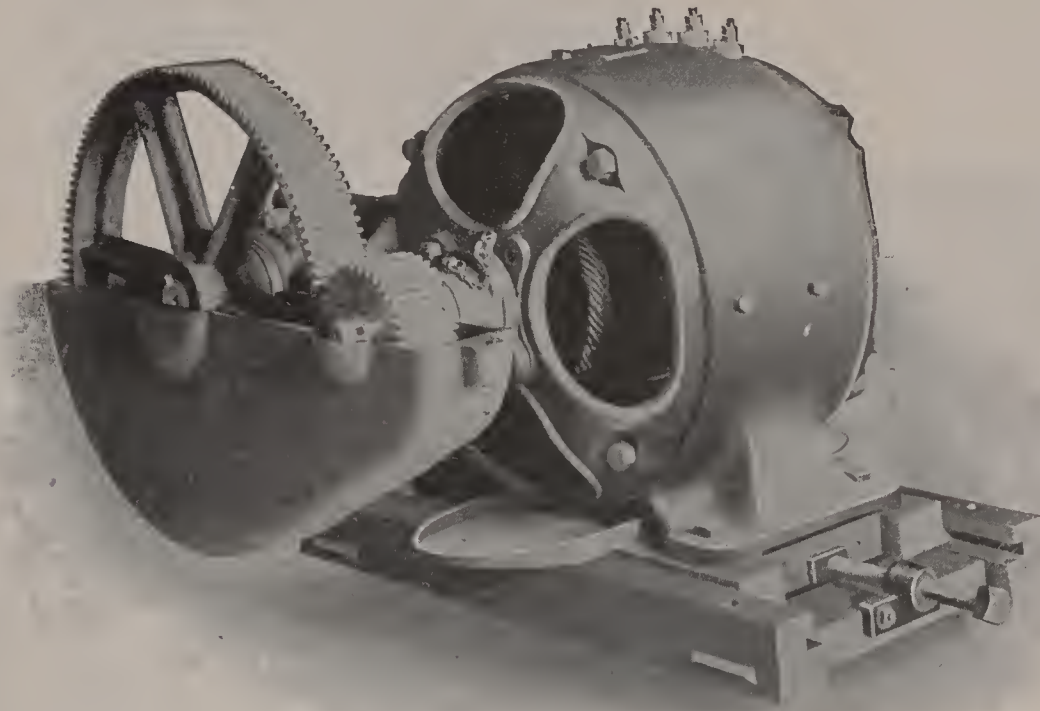


Figure 488.

Direct Current Motor, Back Geared.

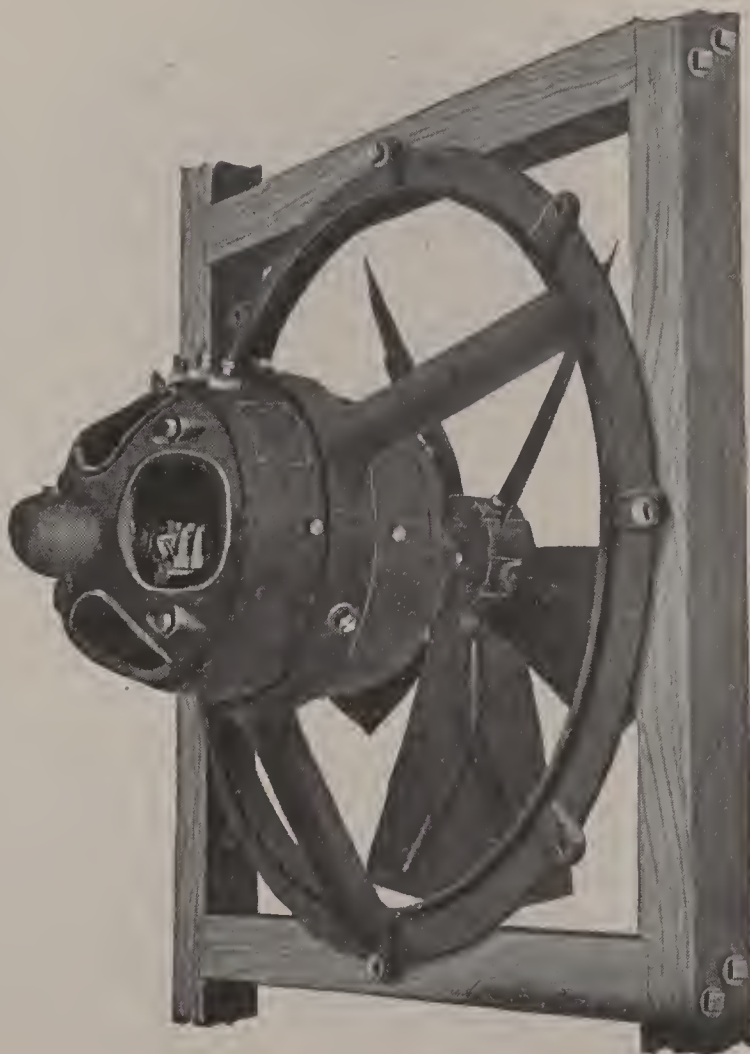


Figure 489.

Direct Current Motor, Driving Ventilating Fan.

MOTORS (Continued).

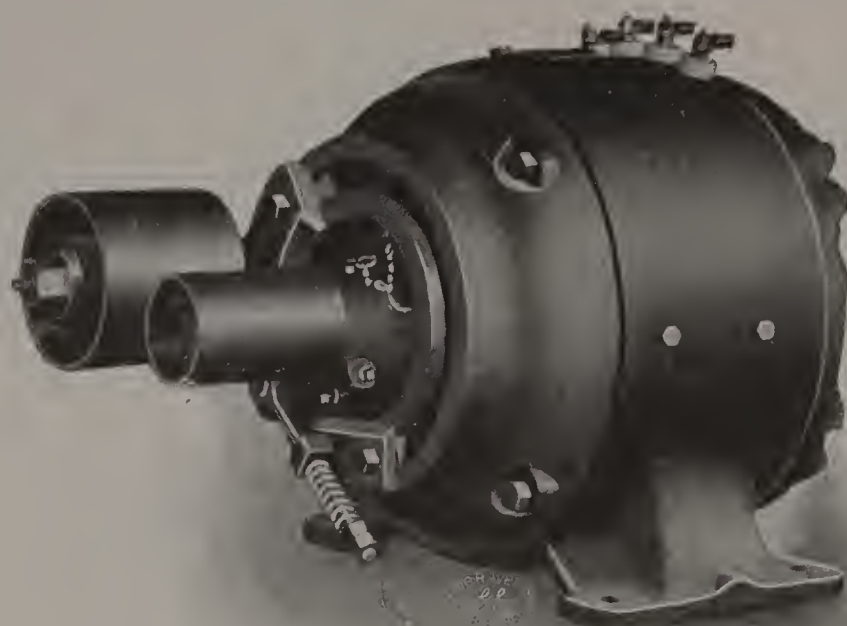


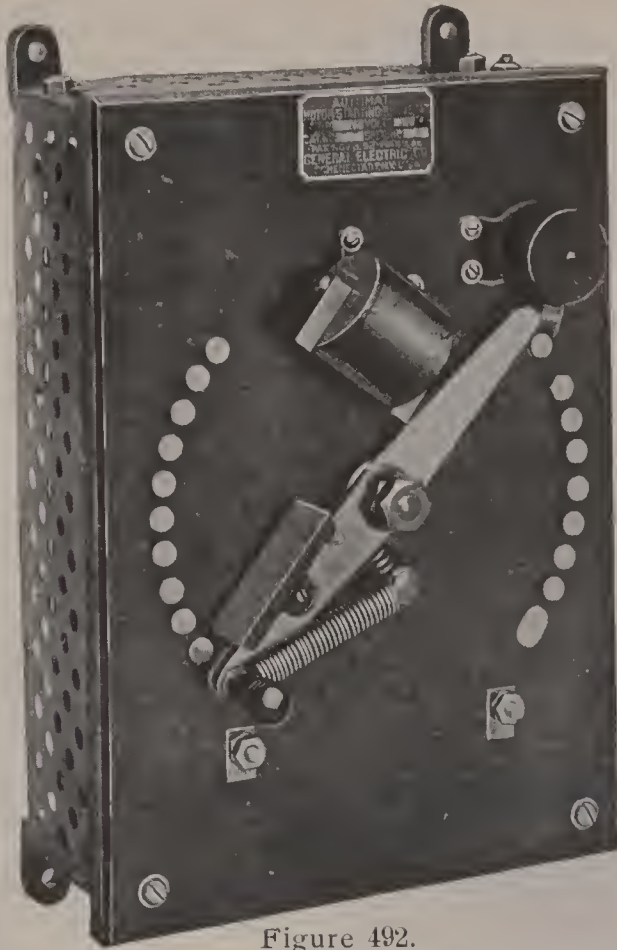
Figure 490.
Motor with Belt Tightener.

BEARINGS.



Figure 491.
Self-Oiling Bearing.

The bearings used are of the self-aligning, self-oiling type. As will be noticed by reference to the illustration, they are provided with revolving rings which carry from the reservoir a continual supply of oil, which is swept by the action of the revolving shaft toward the center and ends of the bearing. It is there collected and returned to the reservoir, where it has time to settle and cool. In this manner a continual circulation of oil through the bearings is automatically accomplished, the bearings requiring no attention beyond an occasional examination and the necessary renewal of oil from time to time.



Motor Starting Rheostat with
No-Voltage Release Magnet, and
Magnetic Blow-Out at First Step.

Figure 492.



Figure 493.

Sewing Machine Driven by Motor.

DIRECT CONNECTED DRILLS.

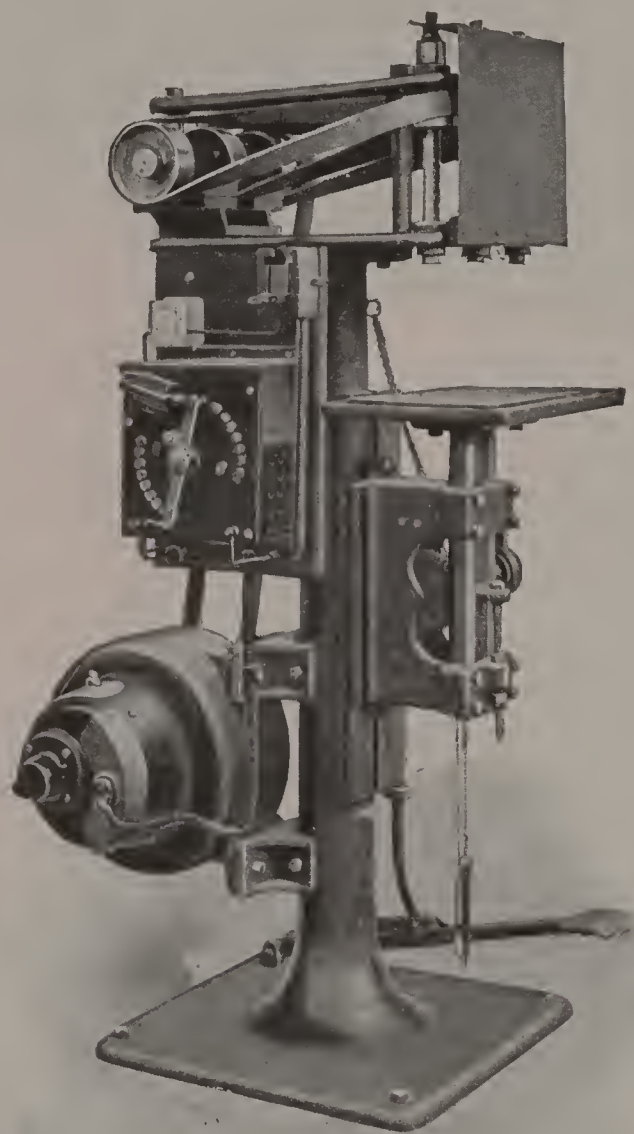


Figure 494.

Three-Spindle Drill Equipped with 2 H. P. Motor.

DIRECT CONNECTED PUMPS.

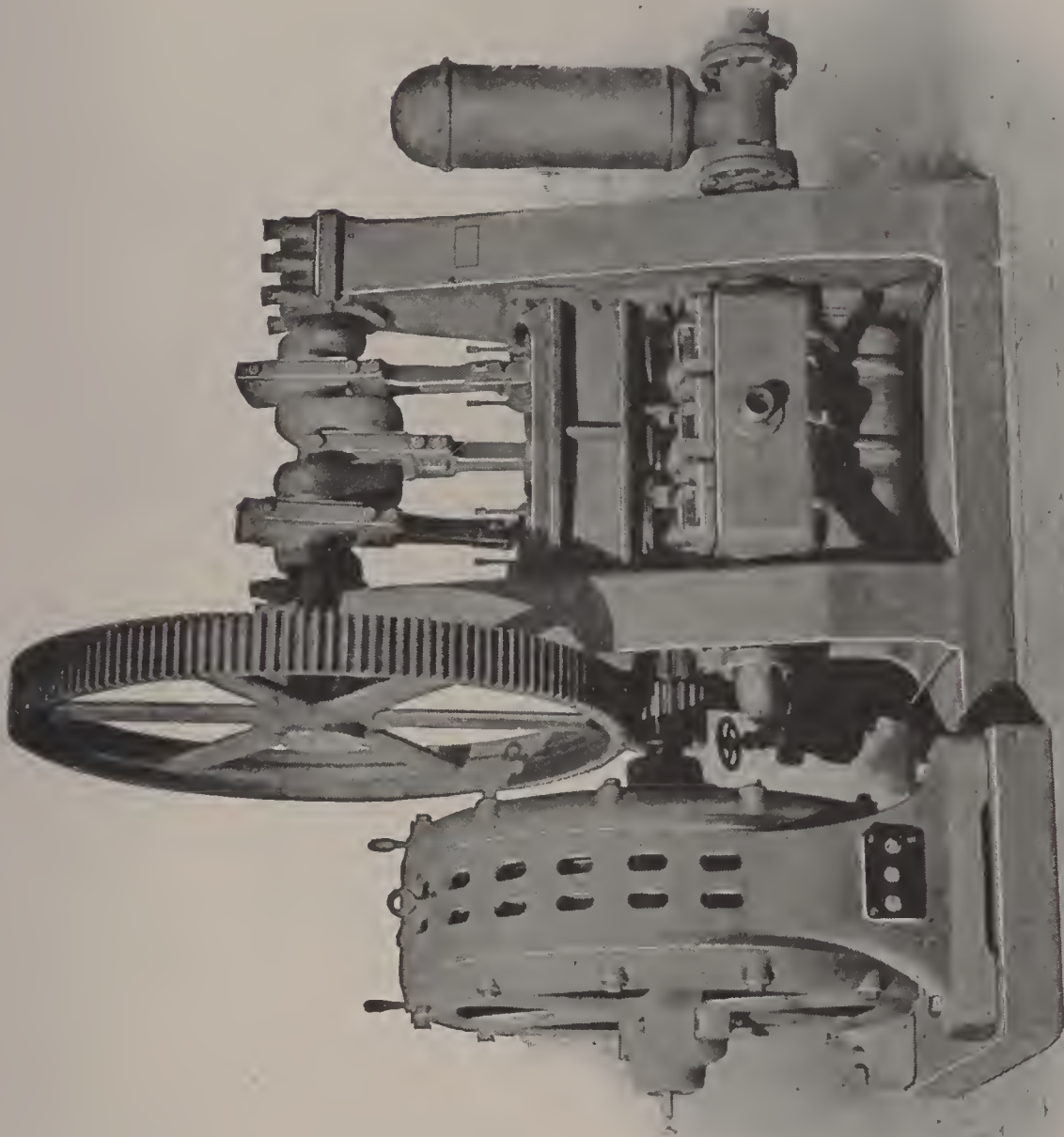


Figure 495.

The above shows direct connected motor and triplex pump. We furnish motors and pumps for belt connection when preferred.

DIRECT CONNECTED UNITS.

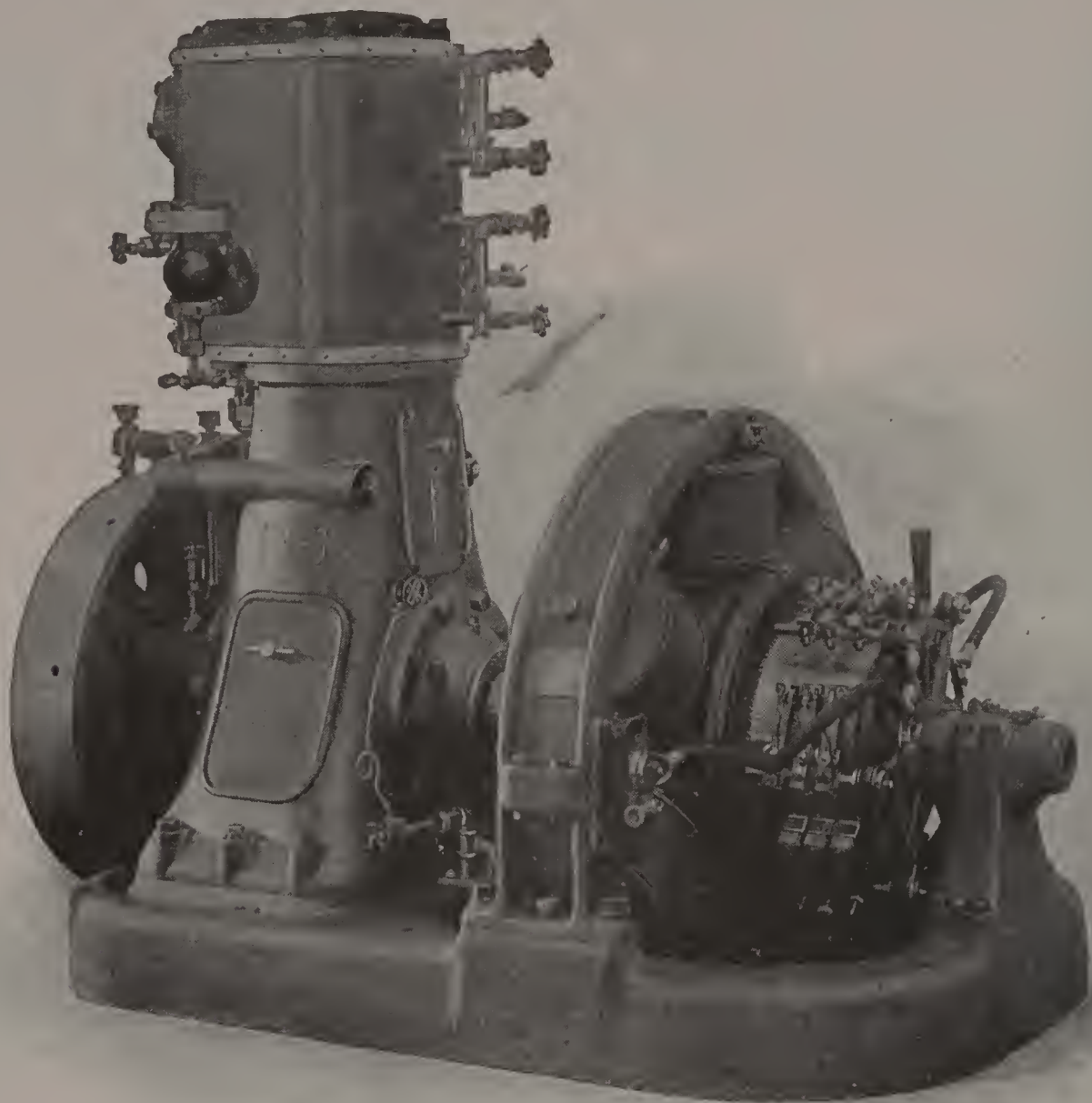


Figure 496.

Direct Connected Engine and Generator for Light or Power.

Classification.				Volts, Full Load.	Amperes, Full Load.	Floor Space.	Height.	Weight, Pounds.	Diameter Steam Pipe.	Diameter Exhaust Pipe	Diameter Cylinder.	Stroke.
Type.	Poles.	Kw.	Speed.									
M P	6-	7-	550	110	64	47" x 30"	50½"	2600	1¼"	1½"	5 "	4½"
M P	6-10-	450		110	91	54" x 34"	56½"	3100	1½"	2 "	6½"	5 "
M P	6-15-	400		110	136	65" x 38"	64 "	4600	2 "	2½"	8 "	6 "
M P	8-20-	360		110	182	65" x 42"	71½"	5800	2½"	3 "	9 "	7 "
M P	6-50-	280		125	400	98" x 55"	99 "	13000	3½"	4 "	12 "	11 "

Ratings of sets with single cylinder engines based on 80 pounds steam, non-condensing.

DIRECT CONNECTED UNITS (Continued).

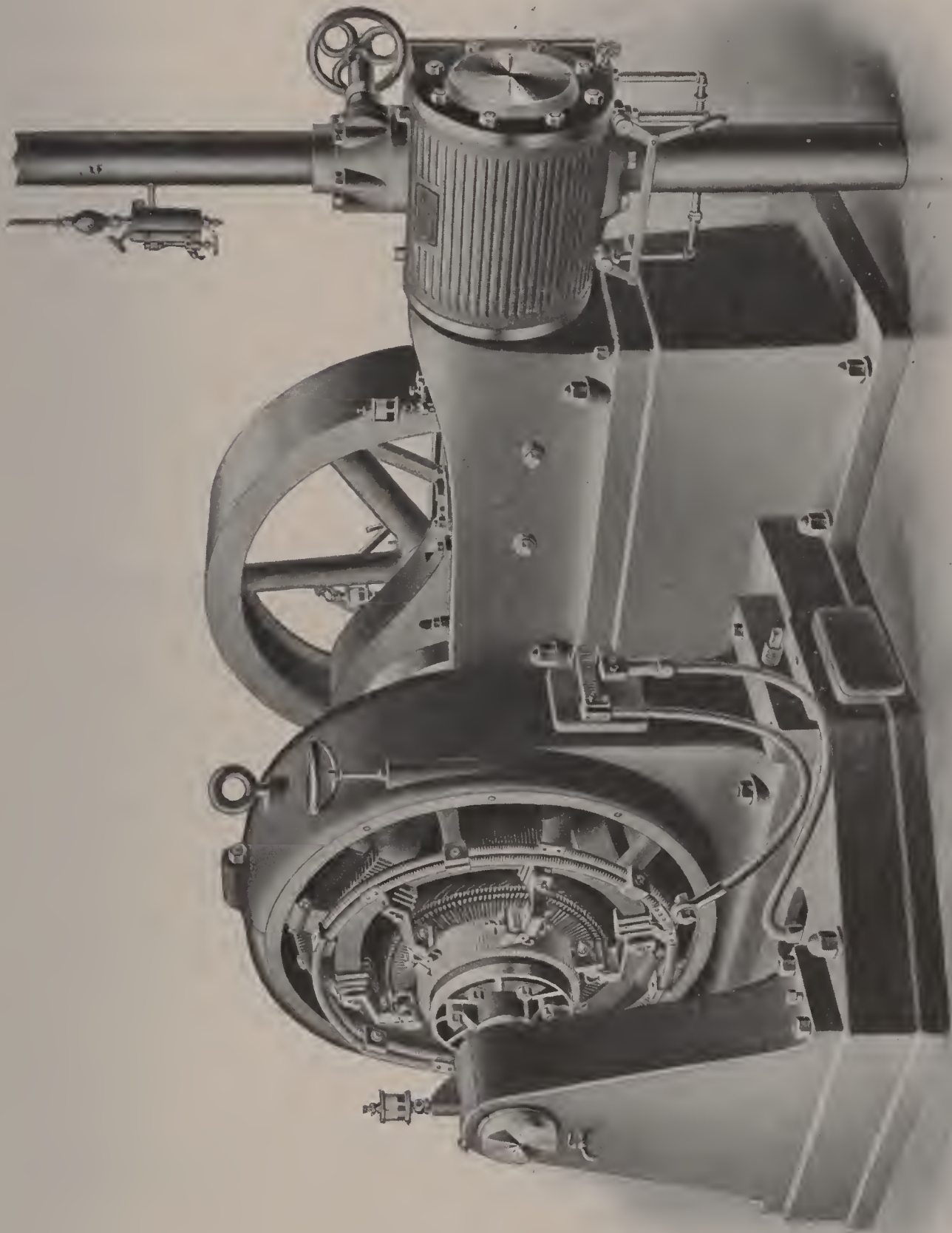


Figure 497.
Direct Connected Engine and Generator for Light or Power.

CEILING FANS.



[Figure 493.

The Gyrofan.

(With Electrolier Attachment.)

The excellence of this novel fixture, its wide range of usefulness, and its adaptability are very notable.

1. The two fans can be set to blow horizontally, or at any downward angle, and one fan can be set at a different angle from the other.

2. The base of the fixture revolves while the two fans rotate, and the speed of revolution can be varied by a simple adjustment.

3. The fixture can be set rigid, and the two fans arranged to throw their blast in any desired direction; thus a current of air may be blown in both directions in an aisle, or the fixture may be set at the intersection of two aisles in a store and the blast of one fan be directed down each aisle.

4. The switch on the base of the fixture controls the fans.

5. The switch on the base of the Electrolier Attachment is arranged with four contacts, so that the fans can be operated alone, the lights alone, or the fans and the lights simultaneously.

6. The Gyrofan, notwithstanding it carries two motors, consumes 25 per cent less current than any ceiling fan on the market, and yet,

7. It disturbs a vastly greater volume of air than any ceiling fan of the old types, and in more useful directions.

CEILING FANS (Continued).

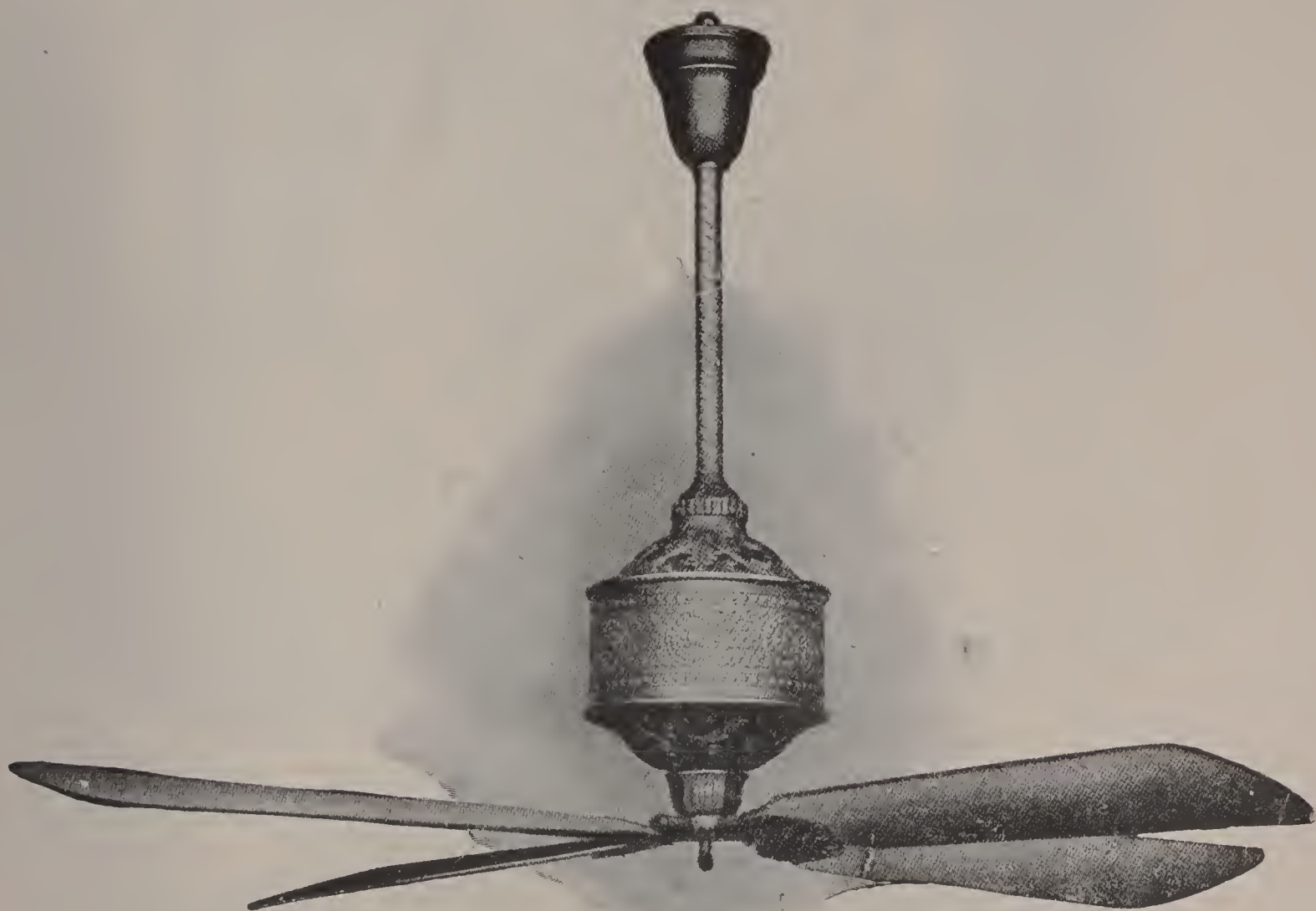


Figure 499.

Direct Current Ceiling Fan.
(Without Electrolier Attachment.)

PRICE LIST.

No. Blades	Vol- tage.	First Speed.	Full Speed.	Amp.	Finish.	Shipping Weight.	Price.
4	110	110	200	1	Pol. Brass	100	\$50 00
4	170	110	200	.70	Pol. Brass	100	51 75
4	220	110	200	.55	Pol. Brass	100	55 00
4	250	110	200	.45	Pol. Brass	100	55 00
4	500	110	200	.23	Pol. Brass	100	75 00
2	110	130	220	1	Pol. Brass	100	50 00
2	170	130	220	.70	Pol. Brass	100	51 75
2	220	130	220	.55	Pol. Brass	100	55 00
2	250	130	220	.45	Pol. Brass	100	55 00
2	500	...	220	.23	Pol. Brass	100	75 00

500-volt Fans have one speed only. Standard lengths of fans from ceiling to lowest extremity, 4½ feet, leaving 7½ feet from lowest point of motor to floor of 12-foot ceiling. Add 90 cents to list price for each additional foot of hanger rod and casing.

BRACKET FANS.

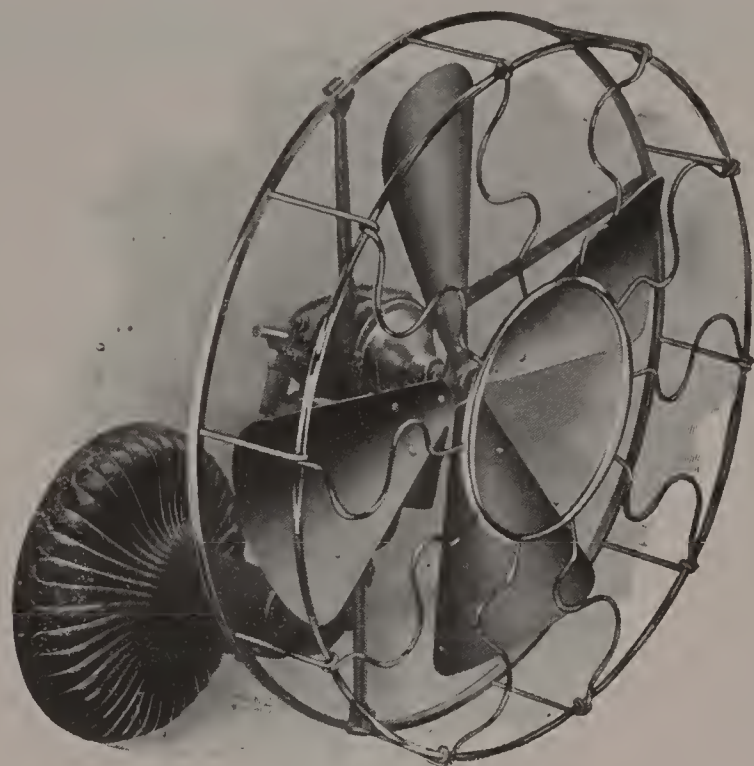


Figure 500.

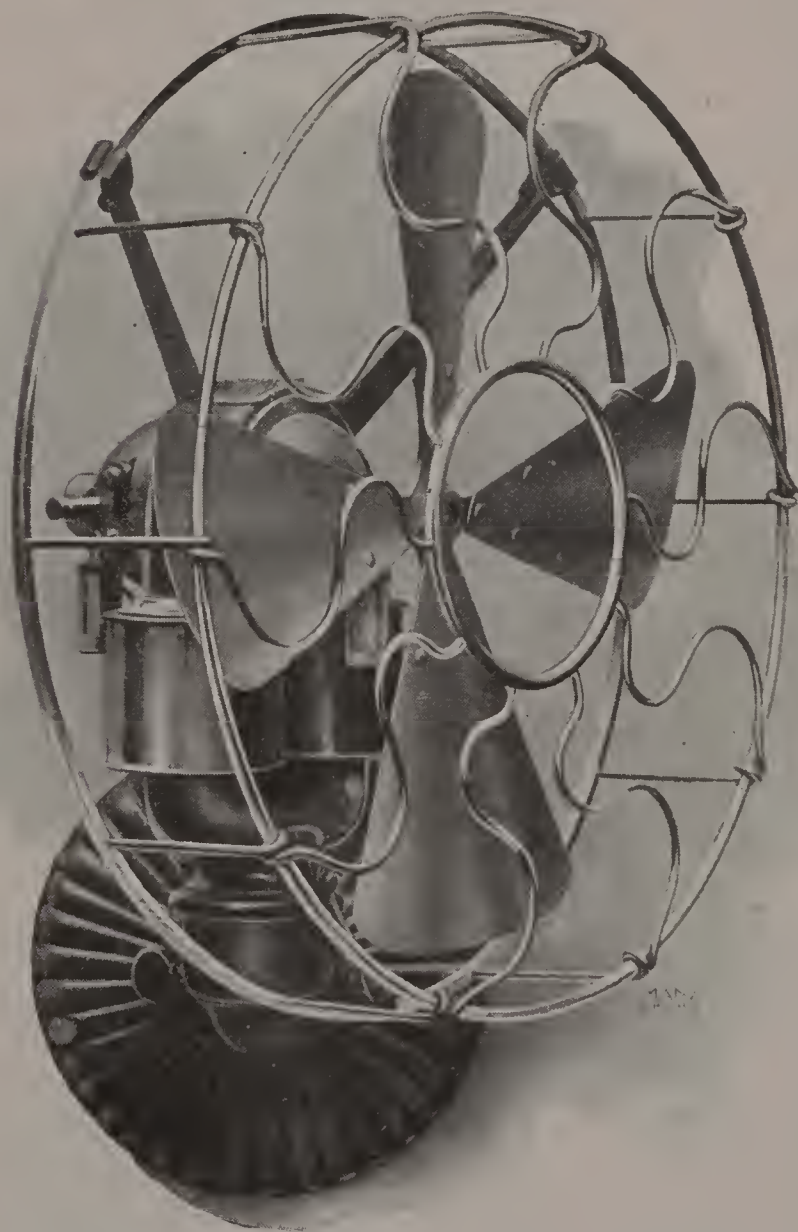


Figure 501.

PRICE LIST.

Fig.	Diameter Fan Inches.	Voltage.	Amperage.	Speed.	Shipping Weight.	Price.
500 {	12	110	.35	1650	32	\$30 00
	12	220	.22	1650	32	33 50
501 {	16	110	.60	1350	49	36 75
	16	220	.30	1350	49	40 00

ENCLOSED ARC LAMPS.



Figure 502.

Fig. 502—For indoor or outdoor service. Standard case japanned steel. Bauer-Barth finish to order.

Fig. 503—Closed base outer globe. Low energy arc lamp.

Fig. 504—Single globe, low energy arc lamp.

Fig. 505—Standard case japanned steel, Bauer-Barth finish to order. For indoor service. Available for outdoor service by change of shade to globe.

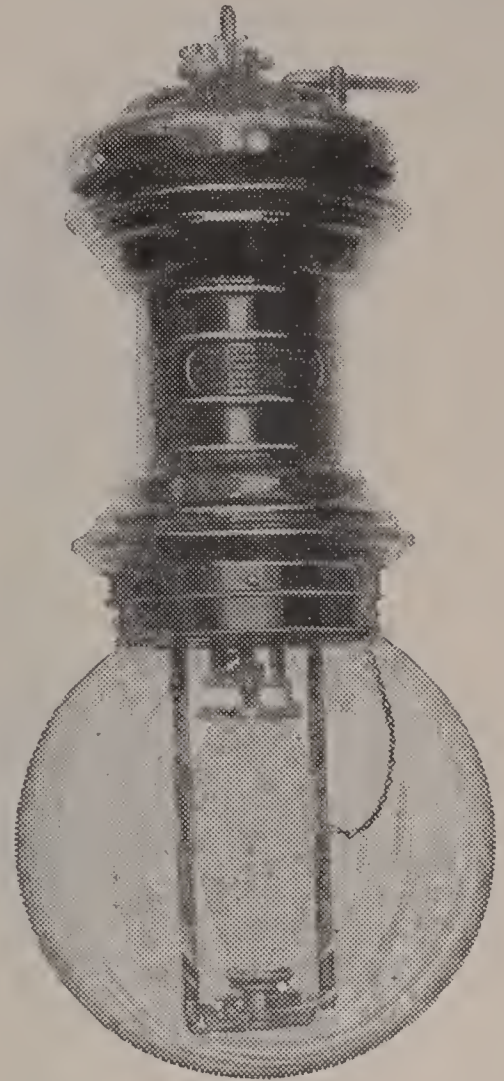


Figure 503.

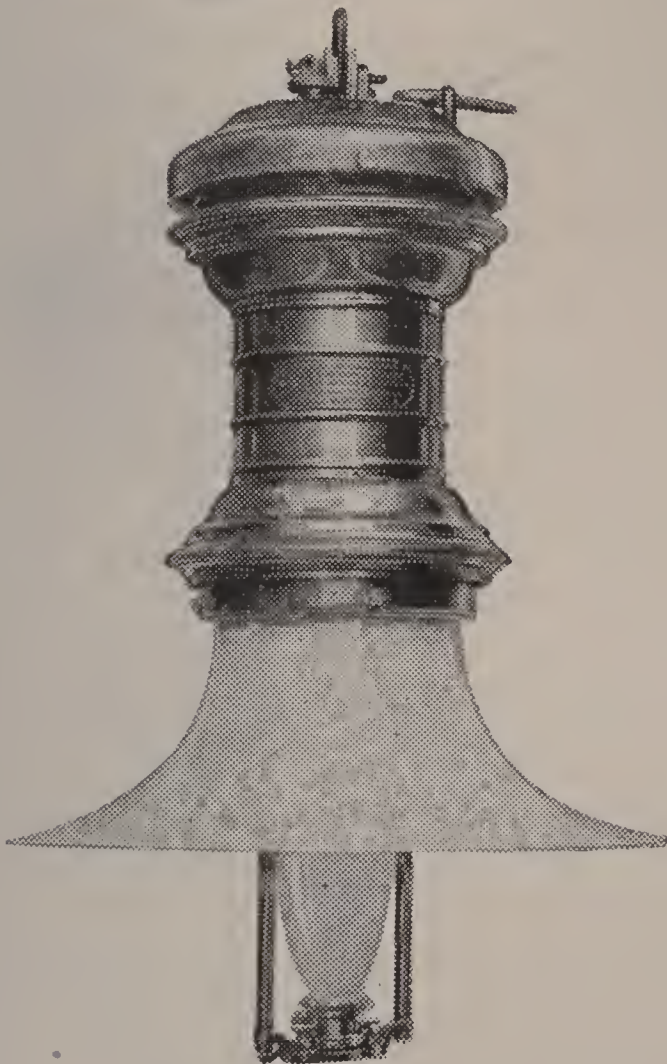


Figure 504.

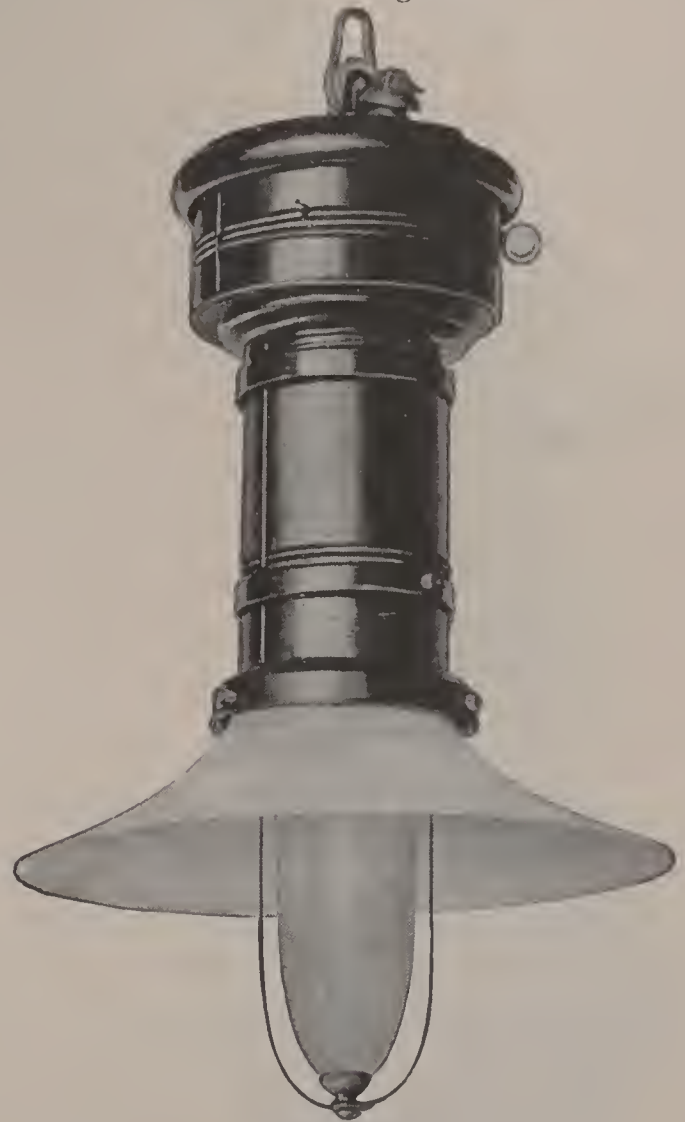


Figure 505.

Globes and Shades on Lamps illustrated are interchangeable.
Order by Figure Number.

Lamps illustrated above are for Multiple Service on Direct Current Circuits of 100 volts and up to 125 volts, usual adjustment 5 amperes; also on 200 and up to 250 volt circuits, usual adjustment $2\frac{1}{2}$ amperes.

ENCLOSED ARC LAMPS (Continued).

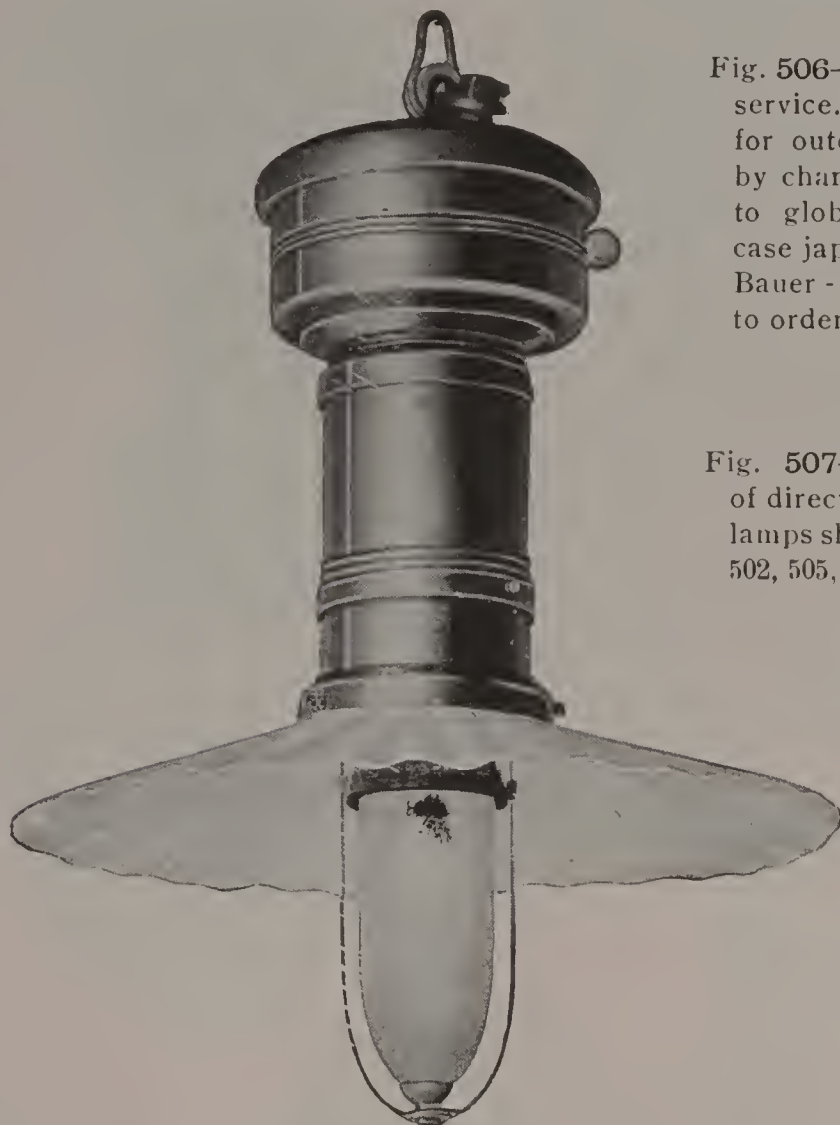


Figure 506.

Fig. 506—For indoor service. Available for outdoor service by change of shade to globe. Standard case japanned steel. Bauer - Barth finish to order.

Fig. 507—Mechanism of direct current lamps shown in Figs. 502, 505, 506.

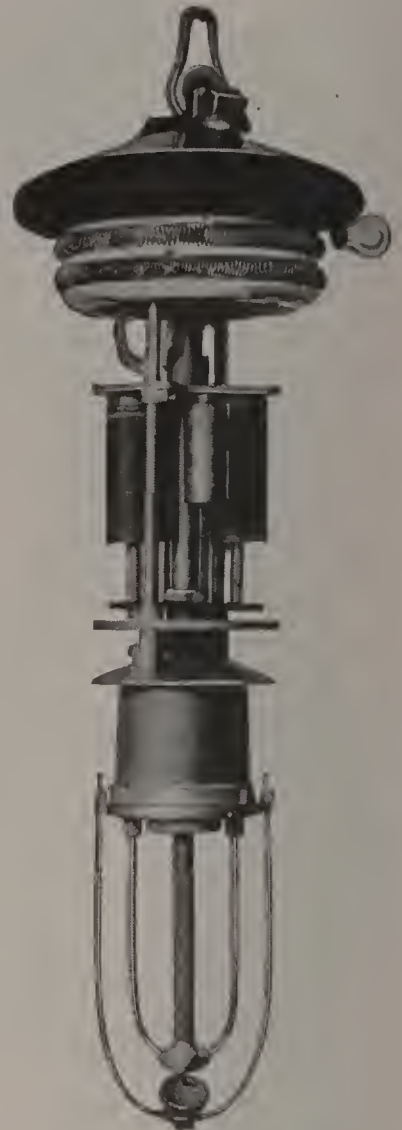


Figure 507.

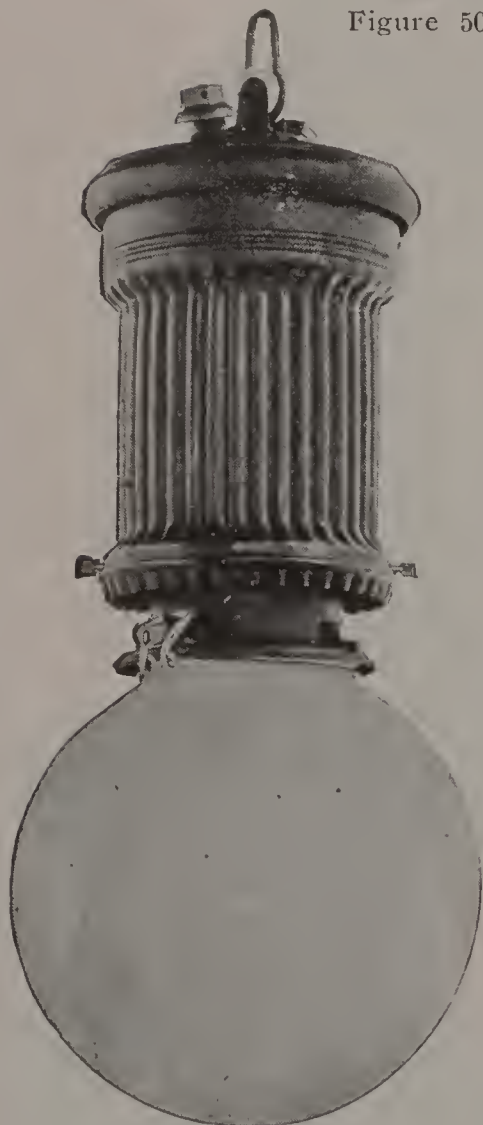


Figure 508.

Fig 508—Indoor or outdoor service. Regular case finish oxidized copper on heavy copper stock. Japanned steel cases, same design, for direct current Lamps only.

Fig. 509- Main structure common to all Lamps.

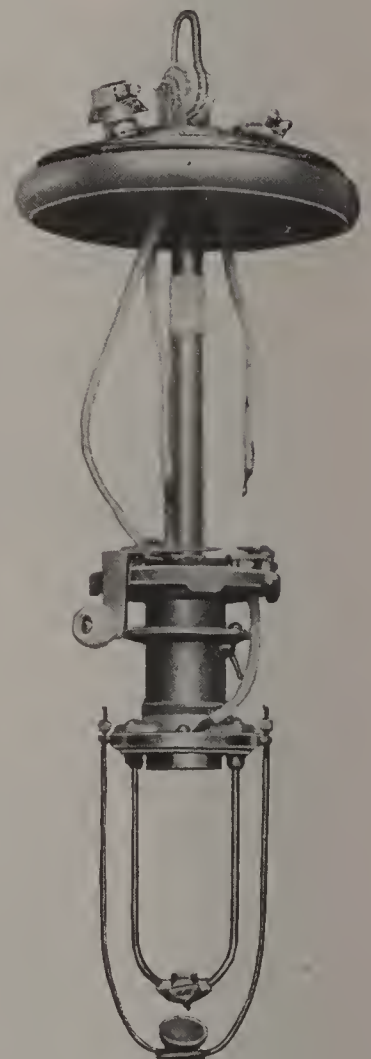


Figure 509.

Lamps illustrated above are interchangeable for either alternating or direct current for constant potential low tension circuits.

ENCLOSED ARC LAMPS (Continued).

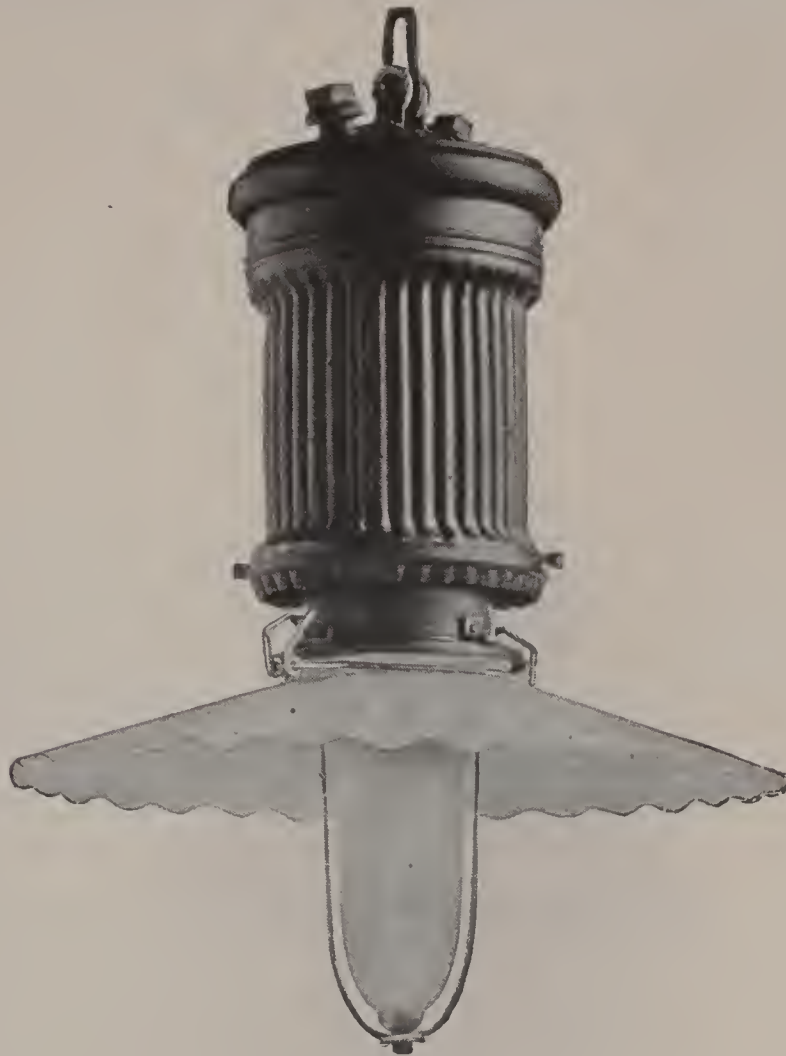


Figure 510.

Indoor service. Regular case finish. Oxidized copper on heavy copper stock. Japanned steel cases, same design for direct current lamps only.

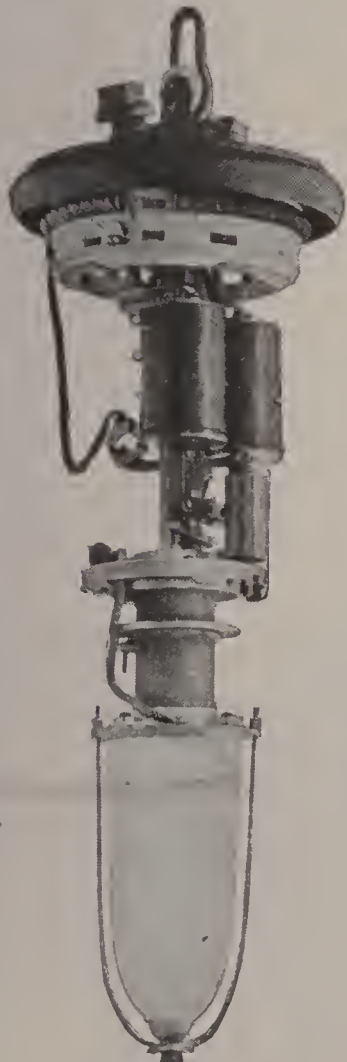


Figure 511.

Fig. 511—Main structure equipped with 110 V. direct current mechanism. Ready for case and outer globe or shade.

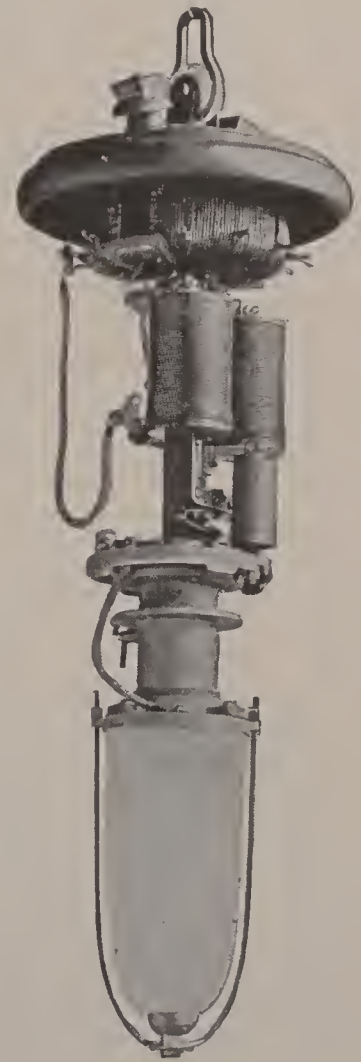


Figure 512.

Fig. 512—Main structure equipped with alternating mechanism. A reactance coil substituted for rheostat shown in Fig. 511. Ready for case and outer globe or shade.

MERIDIAN LAMP.



Figure 513.

The Meridian Lamp.

Many classes of general illumination demand a unit of light intermediate in size between the arc and incandescent lamp. Convenience and durability require the intermediate unit to be as simple as the ordinary incandescent lamp, while economy and comfort necessitate the concentration of the light on the area beneath the lamp and uniform distribution throughout this area.

These requirements are met by the Meridian Lamp, a new type of incandescent lamp which was introduced to cover that field in lighting for which the arc lamp is too large and the incandescent lamp too small. As shown in the accompanying illustrations, it is a neat and novel combination of a properly designed incandescent lamp with a suitable reflector and collar detachable from the lamp. The lamp filament is of special design and accurately located in the bulb in reference to the reflector. The combination of these features with a sand-blasted globe produces a soft, brilliant white light, well diffused and uniformly distributed beneath the lamp.

FITTINGS FOR MERIDIAN LAMP.

The Socket collar for the Meridian Lamp fits either key or keyless standard sockets and is supplied in polished brass or dead black finish. The socket is not a part of outfit.

The reflector is made of aluminum with dead black finish exterior.

The Meridian Lamp is designed essentially for ceiling suspension and is not suitable for attachment to wall brackets or side fixtures. It is evident that the length of the rod must be regulated by the height of the ceiling and the character of the illumination required. If the lamps are to be used over tables for reading, etc., the globes should hang about 4 or 5 feet from the table. If the light is wanted for general illuminating purposes, the globes might hang from 8 to 12 feet above the floor, according to the character of the surrounding walls and ceiling.

Meridian lamps must be ordered by voltage and watts and type of fitting.

The bulbs are supplied tipless and frosted, unless clear bulbs are specified in order.

Prices and additional data on Meridian lamps are given in the following table. The price of additional tubing and pipe is 25 cents per foot.



Figure 514.

Parts of Meridian Lamp.

PRICE LIST.

Voltage.	Maximum Downward C. P.	Total Watt Consump- tion.	Watts per Maximum Downward C. P.	Size Bulb.	Price of Lamps for Renewal Purposes.	Price of Lamp with Reflector and Collar.	Price of Lamp with Reflector, Collar, Socket, One Foot of Tubing and Pipe, Ceiling Canopy and Crow Foot.
90-130	55	105	1.91	5"	\$0.80	\$2.00	\$3.00
90-130	55	120	2.18	5"	.80	2.00	3.00

INCANDESCENT LAMPS.

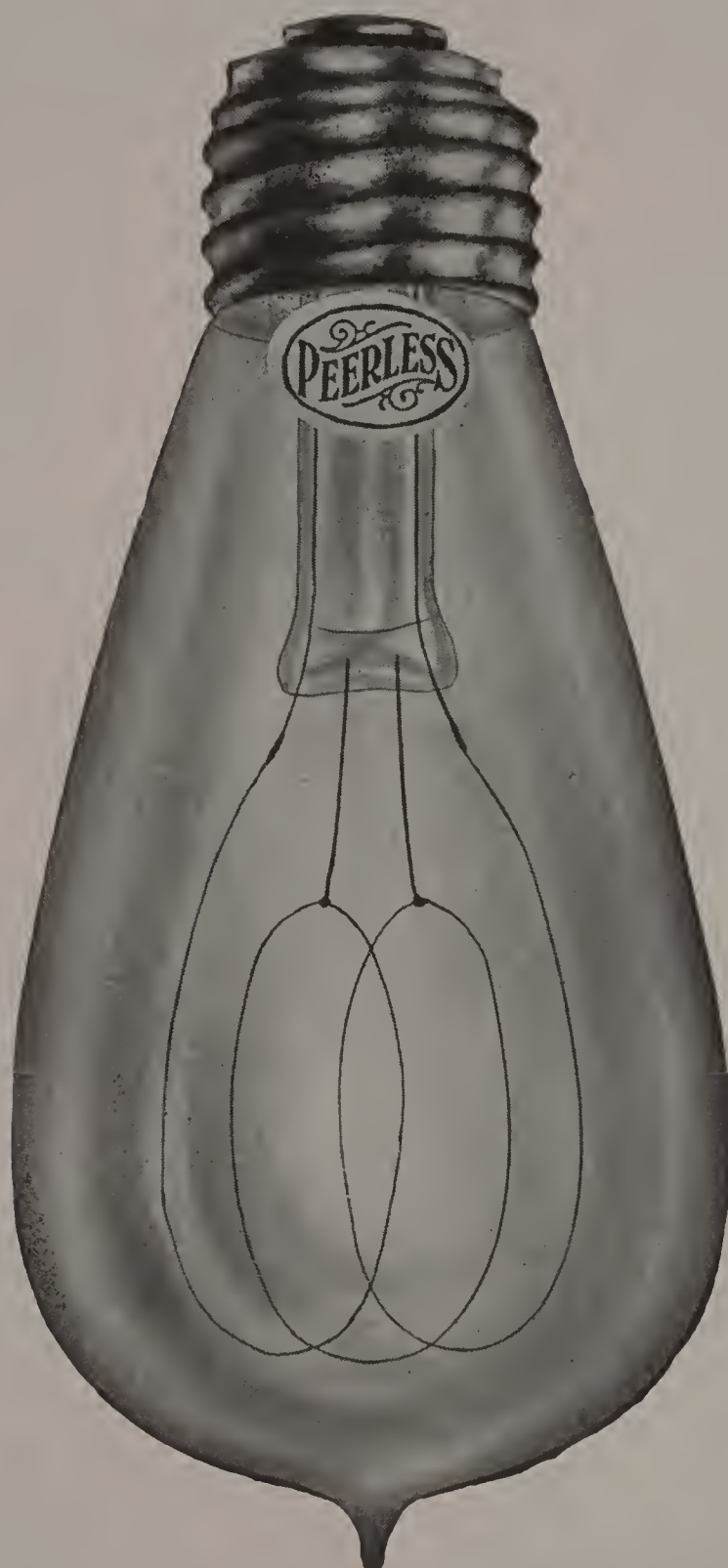


Figure 515.

New Type Incandescent Lamps.

INCANDESCENT LAMPS (Continued).

EFFICIENCY.

INCANDESCENT LAMPS IN THE FOLLOWING EFFICIENCIES:

Lamps of 16, 20, 25, 32 and 50 C. P., 45 to 130 volts, inclusive, 3, 3.1, 3.5, 3.6, 3.8 and 4 watts per candle power.

Lamps of 4, 6 and 8 C. P., 45 to 130 volts, inclusive, 3.5, 4 and 4.5 watts per candle power.

Lamps of 8, 10, 16, 20 and 24 C. P., 200 to 300 volts, inclusive, 4 watts per candle power.

Lamps of 32 and 50 C. P., 200 to 300 volts, inclusive, 3.5 and 4 watts per candle power.

Unless otherwise specified, orders for lamps 45 to 130 volts will be filled with lamps of 3.5 watts per candle power. Lamps of 200 to 300 volts, 4 watts per candle power.

Lamps of special efficiencies, not included in the above, manufactured to order.

STANDARD PACKAGES.

One Barrel or Case (200 lamps) of 4, 6, 8, 10, 16, 20, 24 and 25 C. P., including small round bulb and candle or bung-hole lamps.

One Barrel or Case (100 lamps) of 32 or 50 C. P.

One Barrel or Case (20 lamps) of 100 C. P.

3.5 Watt per candle power is usually used by manufacturing plants.

Write for prices.

INCANDESCENT LAMPS (Continued).



Figure 516.

Hylo for Edison Sockets.



Figure 517.

Hylo for T-H Sockets.

Ever since Edison "subdivided the electric light" 20 years ago, people have wanted some way to make the incandescent lamp "turn down."

It is just as necessary and reasonable to moderate *electric* light as to regulate the brightness of *oil* light, *gas* light, or *sun* light, but there was no successful turn-down electric globe until Phelps invented the HYLO.

The HYLO lamp has two light-giving carbon threads. One is of the usual size, making 16 candle power. The other is exceedingly small, a "baby" filament, making only one candle power. The least little turn of the HYLO bulb will put out the Big Filament and light up the Baby. The mechanism which makes this change is part of the lamp itself and is so wonderfully simple that satisfactory operation is assured.

HYLO BABY FILAMENT LAMP.

1. Can be turned up and down—a simple twist of the wrist does it.
2. Saves five-sixths of the light bill when turned down.
3. Lasts as long as 3 ordinary lamps.
4. Goes into any socket like an ordinary lamp.
5. Takes up no more room than an ordinary lamp.
6. May be moved from one socket to another.
7. Can be used with any open shade or reflector.
8. No skill is required to put up or operate.

The two filaments of the HYLO have a combined life of 4,000 hours (1,000 for the big filament and 3,000 for the Baby.) The Baby filament takes so little current that it is not strained, and therefore lasts a very long time.

The first cost of the HYLO is necessarily greater than an ordinary electric lamp, but the final cost is in most cases *less*. If the first cost of the HYLO is distributed, it averages 2 to 3½ cents per month per lamp. It is easy to see that a very small saving in current will offset a monthly expense of 3 cents.

Stated in another way, a HYLO lamp, in the average bathroom or hall, will save enough current in two weeks' time to pay for itself and leave all the comfort and current-saving after that as a clear profit. There is no comfort or real economy in *total* darkness and in fumbling for switches wherever you go. Six HYLO lamps turned down in six different rooms take no more current than one ordinary lamp and save ever so much time and temper.

Prices quoted upon application

SWITCHBOARDS.

We call attention to a line of material, which for excellence of design and construction cannot be surpassed. All of these goods are constructed to meet underwriters' requirements, and are fully guaranteed as to construction and efficiency. We will be pleased to furnish designs and estimates on special work on receipt of specifications.

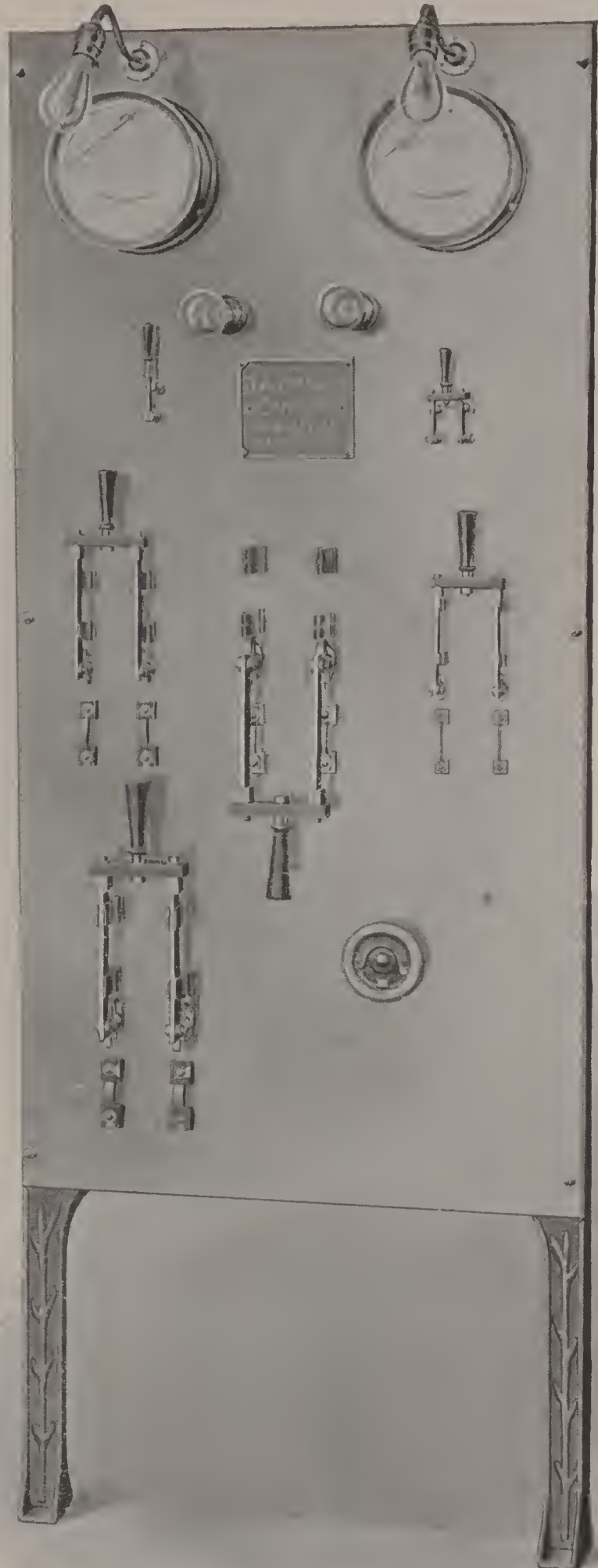


Figure 518.

Switch Boards.

Built in our shops of slate or marble to suit the requirements of any installation.

SWITCHBOARDS (Continued).



Figure 519.
Electric Switch Board.
Made in our Shop.

METERS.



Figure 520.

VOLT METERS.

0 to 130	\$20.00 each	Range of scale, ...	5 inches
250	22.50 each	Diameter of case, ...	8 "
300	25.00 each	Depth of case, ...	3½ "
500	27.50 each	Approximate weight	7 lbs.
750	30.00 each	Shipping weight	10 "

Outside measurement of package ready for shipment, 8½ in. deep x 9¾ in. square.



Figure 521.

AM-METERS.

0 to 100	\$17.50 each	300	\$25 00 each
150	20.00 "	400	27.50 "
200	22.50 "	500	30.00 "
250	25.00 "	750	35.00 "

GROUND DETECTORS.

For 150 Volt Circuit	\$22.00 each
For 250 Volt Circuit	30.00 each
For 500 Volt Circuit	35.00 each

GUARANTEE.

All instruments are carefully tested before they leave works, and are sealed. If instruments are found inaccurate, and returned with seal unbroken, they will be repaired **free of charge**, except transportation charges and where the injury is manifestly the result of accident or careless handling.

CIRCUIT BREAKERS.

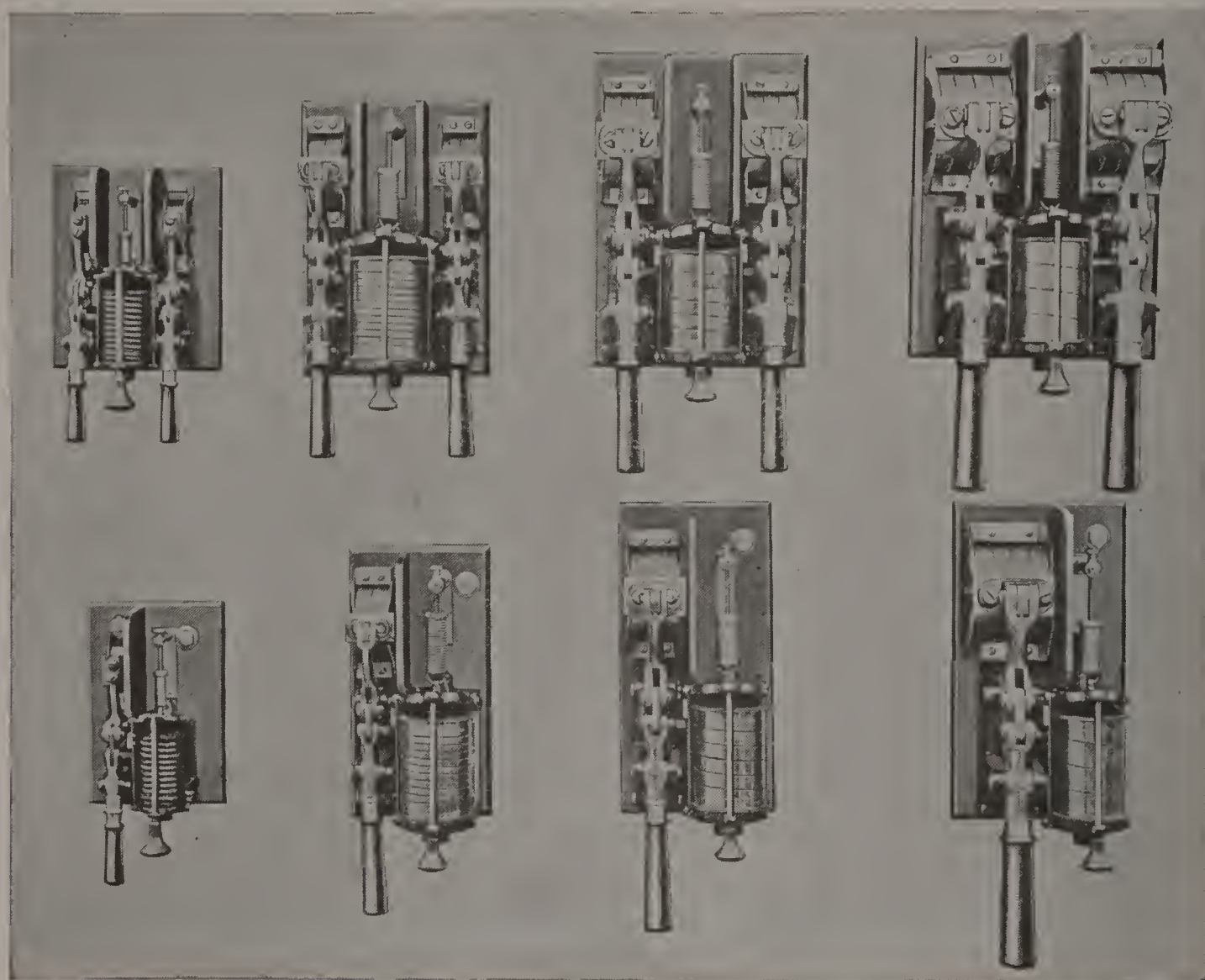


Figure 522.

Automatic Circuit Breakers, Single and Double Pole, Type C, Form D,
50 to 1200 Amperes Capacity.

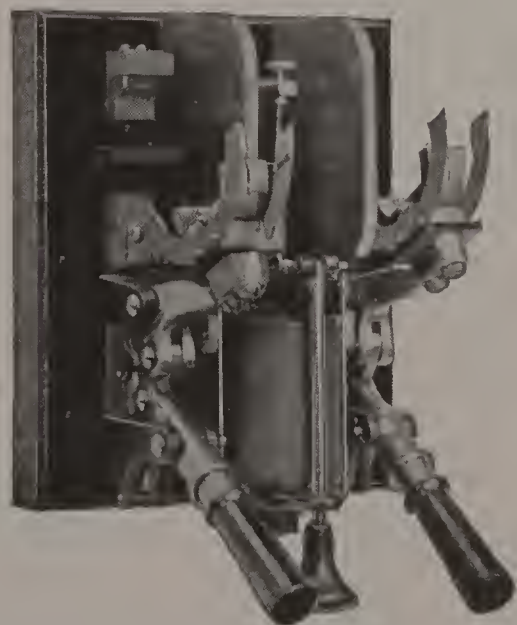


Figure 523.

Type C, Form D, Circuit Breaker.
100 Amps., 250 Volts.

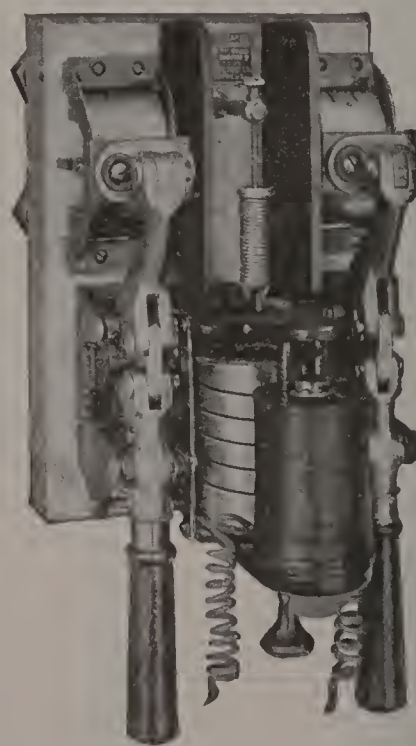


Figure 524.

Type C, Form D, Circuit Breaker with
Underload Attachment.
300 Amps., 250 Volts.

CIRCUIT BREAKERS (Continued).

PRICES OF AUTOMATIC CIRCUIT BREAKERS.

Type C, Form D, Continuous or Alternating Current.

RATING.	TYPE.	LIST PRICE.	
		Cont. Current.	Alt. Current.
50-250	Single Pole	\$ 45.00	\$ 45.00
50-250	Double "	65.00	65.00
100-250	Single "	50.00	50.00
100-250	Double "	70.00	70.00
150-250	Single "	50.00	50.00
150-250	Double "	70.00	70.00
300-250	Single "	80.00	140.00
300-250	Double "	115.00	175.00
800-250	Single "	90.00	
600-250	Single "		160.00
800-250	Double "	140.00	
600-250	Double "		200.00
1200-250	Single "	125.00	
1000-250	Single "		180.00
1200-250	Double "	190.00	

ELECTRIC METERS.



Figure 525.

Electric Meter.

SWITCHES (Continued). MOUNTED.

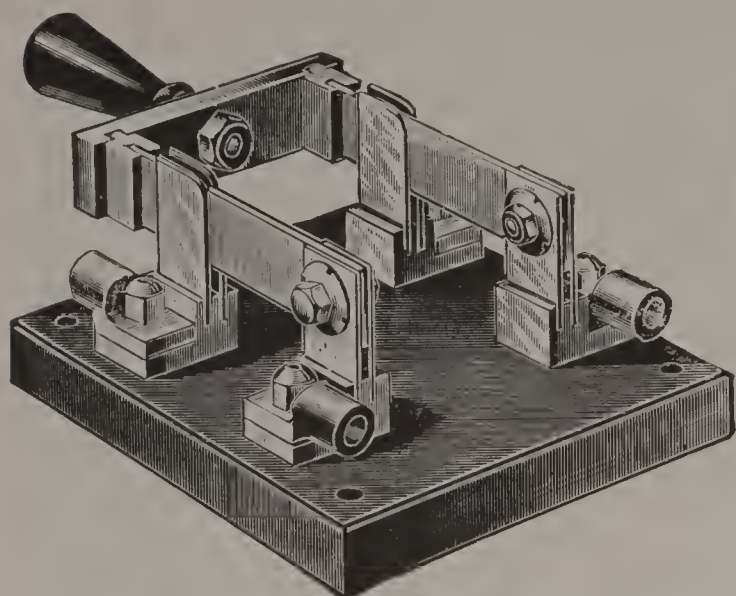


Figure 526.

Double Pole, Single Break, Front
Connected.

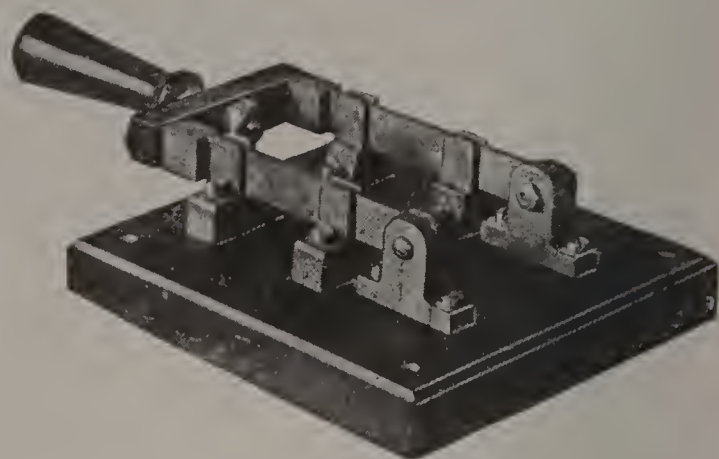


Figure 527.

Double Pole, Double Break. Front
Connected.

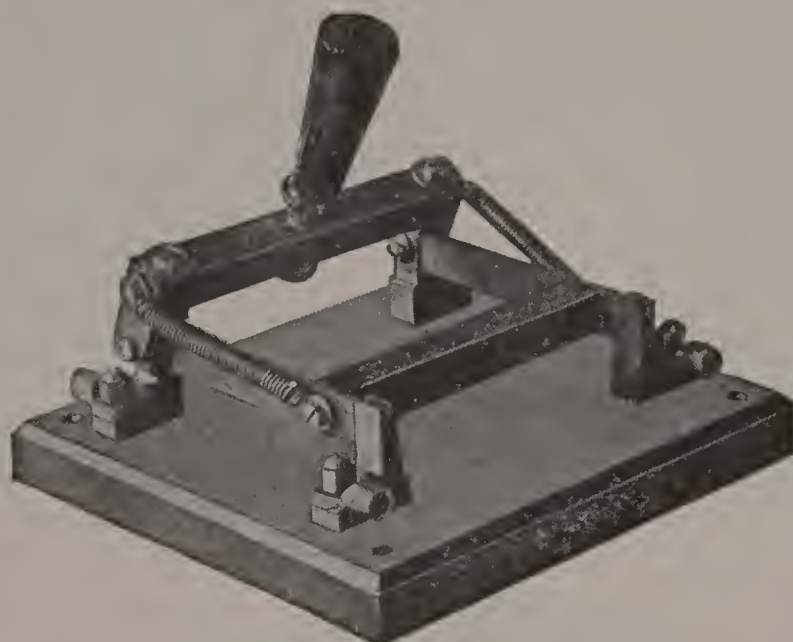


Figure 528.

Double Pole, Single Quick Break,
Front Connected.

UNMOUNTED.

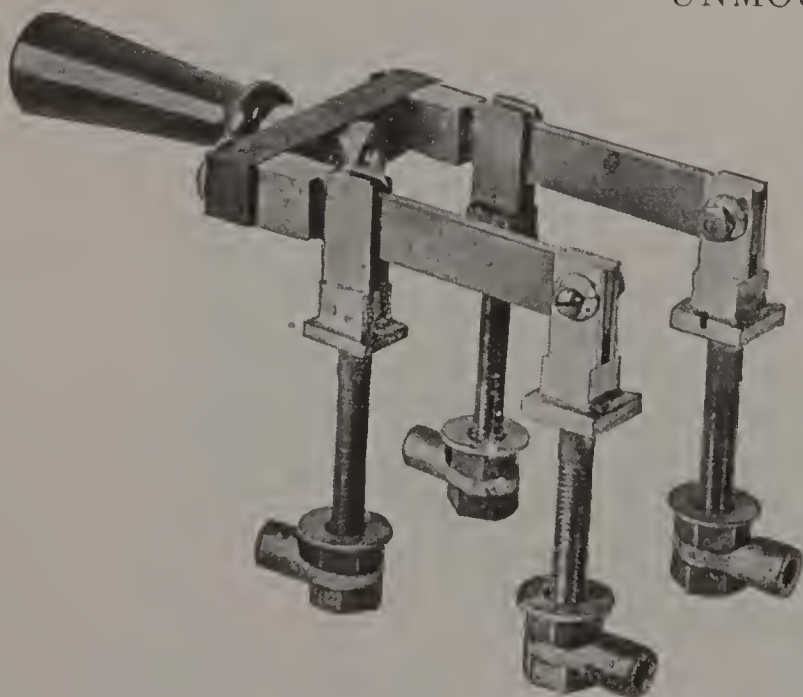


Figure 529.

Double Pole, Single Break, Back
Connected.

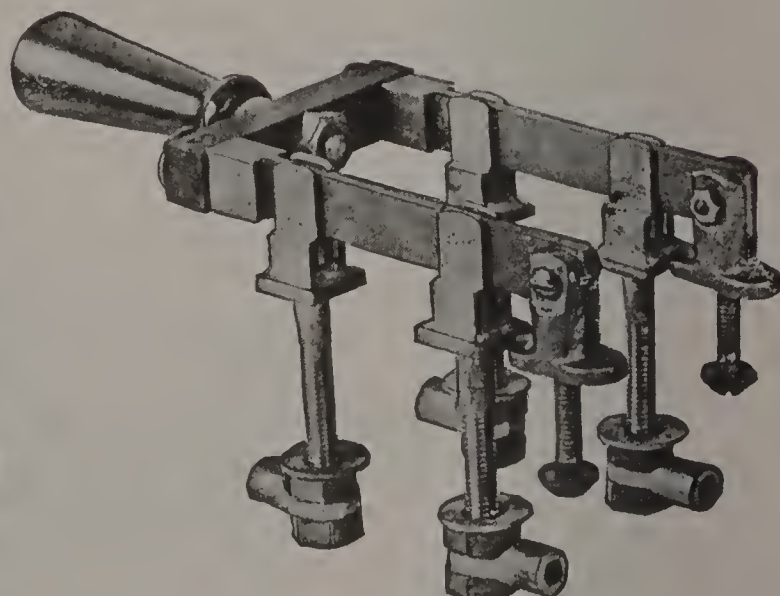


Figure 530.

Double Pole, Double Break, Back
Connected.

FRONT CONNECTED SWITCHES MOUNTED.
PRICE LIST.
SINGLE THROW WITHOUT FUSE.

Amperes.	Single Pole.		Double Pole.		Triple Pole.		Amperes.
	Plain.	Polished.	Plain.	Polished.	Plain.	Polished.	
50	3.00	3.75	5.00	6.50	8.00	10.00	50
100	5.00	6.25	8.50	10.50	13.50	17.00	100
200	7.25	9.00	12.00	15.00	19.00	23.75	200
300	9.00	11.25	15.00	18.75	23.50	29.50	300
400	11.50	14.50	19.00	23.75	30.00	37.50	400
600	15.00	18.75	25.00	31.25	39.50	49.50	600
800	21.00	26.25	35.00	43.75	55.25	69.00	800
1,000	30.00	37.50	50.00	62.50	78.75	98.50	1,000

SINGLE THROW WITH FUSE.

Amperes.	Single Pole.		Double Pole.		Triple Pole.		Amperes.
	Plain.	Polished.	Plain.	Polished.	Plain.	Polished.	
50	3.75	4.75	6.25	8.00	10.00	12.50	50
100	6.25	7.75	10.50	13.00	17.00	21.25	100
200	9.00	11.25	15.00	18.75	23.75	29.75	200
300	11.25	14.00	18.75	23.50	29.50	37.00	300
400	14.50	18.00	23.75	29.75	37.50	47.00	400
600	18.75	23.50	31.25	39.00	49.50	62.00	600
800	26.25	32.75	43.75	54.75	69.00	86.25	800
1,000	37.50	47.00	62.50	78.00	98.50	123.00	1,000

DOUBLE THROW WITHOUT FUSE.

Amperes.	Single Pole.		Double Pole.		Triple Pole.		Amperes.
	Plain.	Polished.	Plain.	Polished.	Plain.	Polished.	
50	4.00	5.00	6.75	8.50	10.75	13.50	50
100	6.75	8.50	11.25	14.00	18.00	22.50	100
200	9.75	12.25	16.00	20.00	25.50	32.00	200
300	12.00	15.00	20.00	25.00	31.50	39.50	200
400	15.25	19.00	25.50	32.00	40.00	50.00	400
600	20.00	25.00	33.50	42.00	52.50	65.75	600
800	28.00	35.00	46.50	58.00	73.75	92.25	800
1,000	40.00	50.00	66.50	83.00	105.00	131.25	1,000

DOUBLE THROW WITH FUSE.

Amperes.	Single Pole.		Double Pole.		Triple Pole.		Amperes.
	Plain.	Polished.	Plain.	Polished.	Plain.	Polished.	
50	5.00	6.25	8.50	10.75	13.50	17.00	50
100	8.50	10.75	14.00	17.50	22.50	28.25	100
200	12.25	15.25	20.00	25.00	32.00	40.00	200
300	15.00	18.75	25.00	31.25	39.50	49.50	300
400	19.00	23.75	32.00	40.00	50.00	62.50	400
600	25.00	31.25	42.00	52.50	65.75	82.25	600
800	35.00	43.75	58.00	72.50	92.25	115.25	800
1,000	50.00	62.50	83.00	103.75	131.25	164.00	1,000

Front connected switches unmounted deduct 10 per cent. Back connected switches unmounted same as list. Back connected switches mounted add 10 per cent.
500-volt switches, except D. T. Fused, add 20 per cent. 500-volt switches, Double Throw Fused, add 40 per cent.

SWITCHES (Continued).

PUNCHED CLIP SPRING SWITCHES.

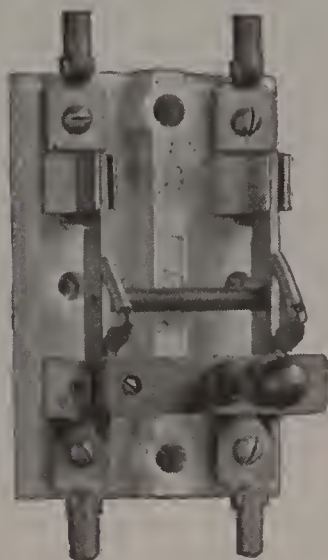


Figure 531.
Double Pole, Quick Break.

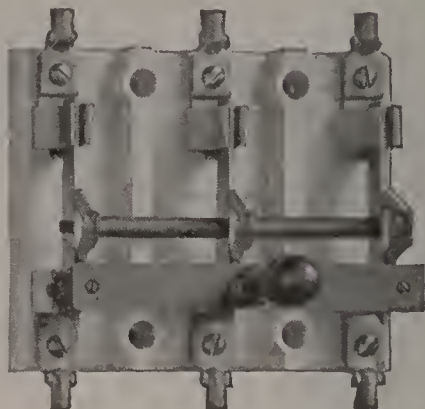


Figure 532.
Triple Pole, Quick Break.

PUNCHED CLIP SPRING SWITCHES WITH EDISON FUSE PLUGS
FOR 125 VOLTS.

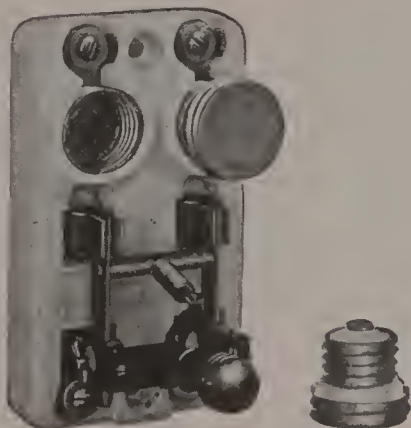


Figure 533.
Double and Triple Pole Switches with Plugs.

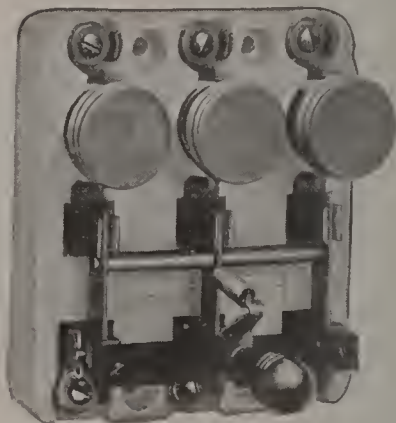


Figure 534.

Description.	List Price.
D. P. S. T., 25 amperes, 125 volts.	\$.200
T. P. S. T., 25 amperes, 125 volts.	2.75



Figure 535.

SNAP SWITCHES.

A line of switches, neat in appearance and of greatly improved design, is illustrated herewith. The switches are compact, the mechanisms quick and positive in action, and the current carrying parts of ample area and cross section. The parts of the switches, both moving and stationary, are few, and are so thoroughly constructed that an exceedingly long life is assured.

These switches have been subjected to the most severe mechanical and
(Continued on following page.)

electrical tests, and have been proved of such a quality as to be classed among the best. The standard finish is nickel plate.

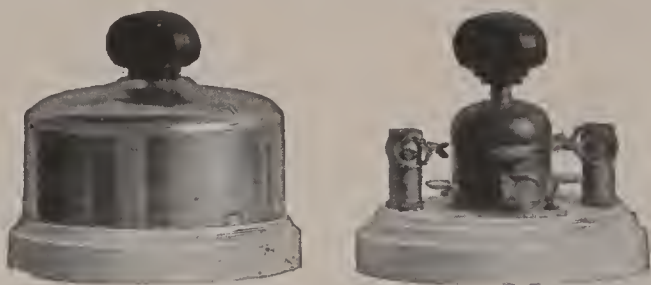


Figure 536.

Description.	List Price.
5 Amperes, 250 Volts and 10 Amperes, 125 Volts, Single-pole . . .	\$.60
10 Amperes, 250 Volts, Double-pole	.85

Double Push Button Flush Pocket Switch.

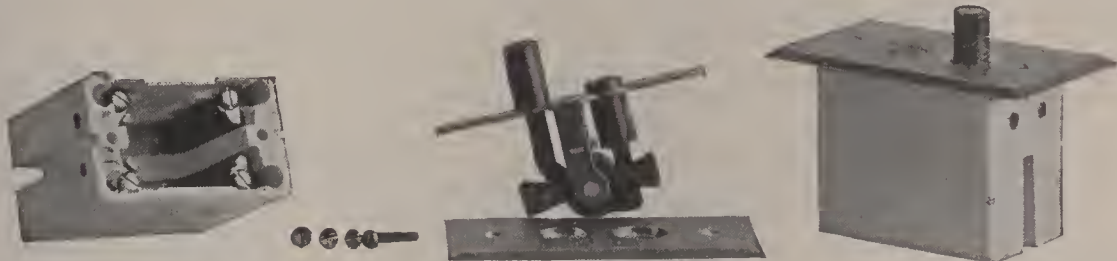


Figure 537.

Parts of Double Push Button Switch.

The double push button, flush pocket switch is designed to meet all requirements. It has a maximum current carrying capacity of 10 amperes, is suitable for installation on 250-volt circuits and may be used in the standard outlet boxes manufactured for the reception of switches of this character.

The essential qualities of devices of this kind are simplicity and durability combined with a positive and reliable action, and the manufacturers feel that these results have been attained.

The mechanism, which is entirely enclosed in a strong porcelain box, insures a quick make and break, has liberal contact surfaces to prevent heating, and contains a small number of working parts. The positive action of the switch is accomplished through the agency of but one strong spiral spring, which, with the other distinctive features of the switch, precludes any possibility of sluggish action or loose parts.

One of the push buttons is finished in keeping with the cover of the switch, while the other is black, so that the position of the switch can be ascertained at a glance. The switch is easily wired from the front, and will withstand the most severe electrical and mechanical tests.

The standard finish is nickel, although other finishes can be furnished if desired. A cast iron wall pocket has been designed for use with these switches in connection with cleat or knob concealed wiring. Prices do not include the wall box.

Description.	List Price.
Single-pole switch, complete, with nickeled cover.....	\$2.35
Double-pole switch, complete, with nickeled cover.....	2.50
Three-way switch, complete, with nickeled cover.....	2.50
Single-pole switch, complete, without cover.....	2.00
Double-pole switch, complete, without cover ..	2.15
Three-way switch, complete, without cover.....	2.15
Nickeled cover for two switches, with screws.....	1.40
Nickeled cover for three switches, with screws.....	1.75
Iron wall box, with screws, for one switch.....	.40
Iron wall box, with screws, for two switches.....	.60
Iron wall box, with screws, for three switches.....	.80

SWITCHES (Continued).

KNIFE SWITCHES.

Type "D" Porcelain Base.

Single Break.

Figure 538.

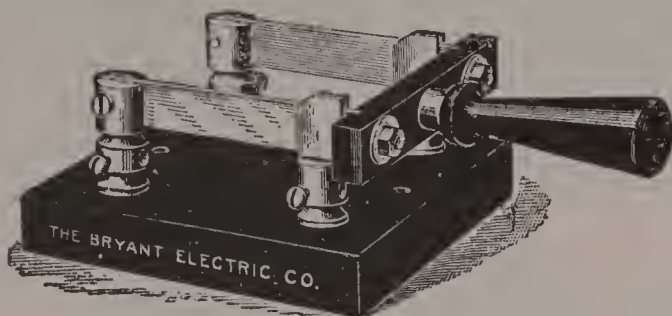


Figure 538.

50 Ampere, D. P., S. T., with Black Enameled Base..	\$1.50
50 Ampere, D. P., S. T., with White Glazed Base.....	1.50

Double Break.

Figure 539.

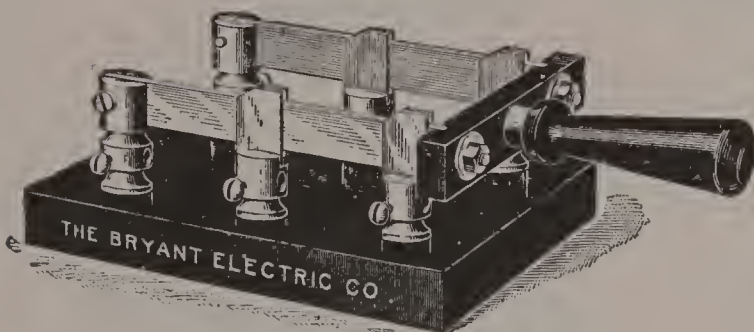


Figure 539.

35 Ampere, D. P., S. T., with Black Enameled Base.....	1.47
35 Ampere, D. P., S. T., with White Glazed Base.....	1.47
50 Ampere, D. P., S. T., with Black Enameled Base.	1.95
50 Ampere, D. P., S. T., with White Glazed Base.....	1.95

Slate Base—250 Volt.

Figure 540.

25 Ampere, S. P., S. T.....	.70
25 " " " Fusible.	.94
35 " " "	.90
35 " " " Fusible.	1.20
50 " " "	1.10
50 " " " Fusible.	1.45
75 " " "	1.50
75 " " " Fusible.	2.00
100 " " "	2.00
100 " " " Fusible.	2.68

Unmounted—250 Volt.

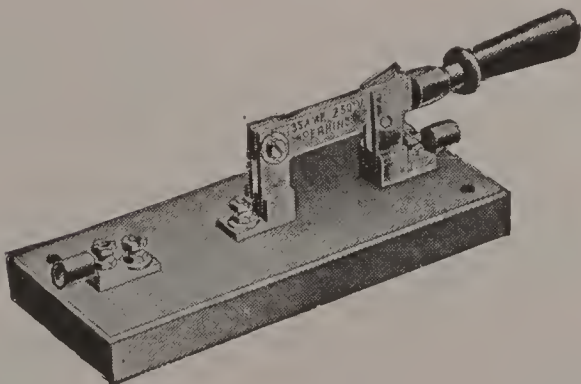


Figure 540.

25 Ampere, S. P., S. T.	.70
25 " " " Fusible.	.94
35 " " "	.90
35 " " " Fusible.	1.20
50 " " "	1.10
50 " " " Fusible.	1.45
75 " " "	1.50
75 " " " Fusible.	2.00
100 " " "	2.00
100 " " " Fusible.	2.68

SWITCHES (Continued).

KNIFE SWITCHES.
Porcelain Base—Type B.

Figure 451.

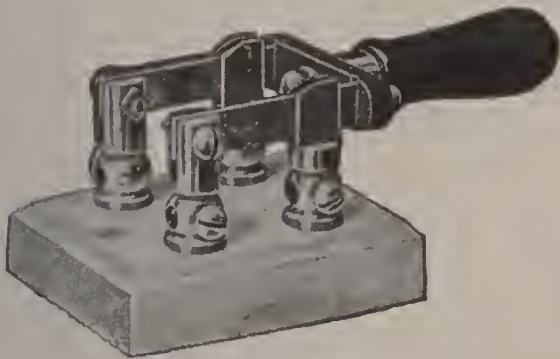


Figure 541.

15	Amperes,	-	S. P., S. T.	\$.34
25	"	-	" "	.44
15	"	-	D. P., "	.50
25	"	-	" "	.60

Unmounted—Type B.

15	Amperes,	-	S. P., S. T.	.34
25	"	-	" "	.44
15	"	-	D. P., "	.50
25	"	-	" "	.60
15	"	-	" D. T.	.74
25	"	-	" "	.90

Type C Slate Base—Single Break.

Figure 542.

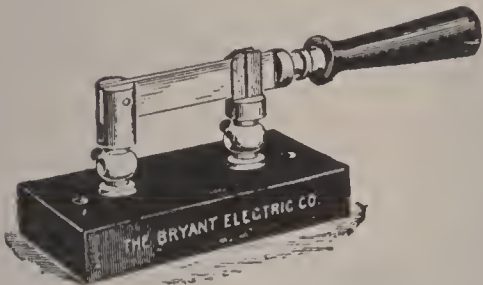


Figure 542.

35	Amperes,	-	S. P., S. T.	.75
35	"	-	" D. T.	1.00
35	"	-	" S. T., Fusible	.90
50	"	-	" "	1.05
50	"	-	" D. T.	1.25
50	"	-	" S. T., Fusible	1.25

Figure 543.

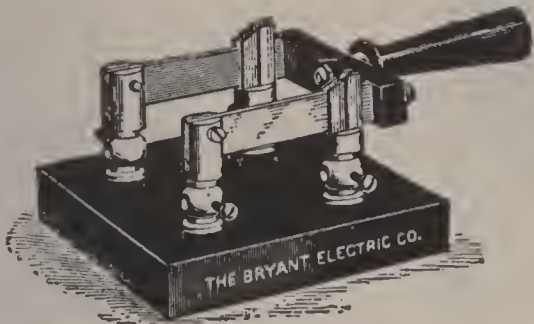


Figure 543.

35	Amperes,	-	D. P., S. T.	1.13
35	"	-	" D. T.	1.47
35	"	-	" S. T., Fusible	1.35
50	"	-	" "	1.55
50	"	-	" D. T.	1.80
50	"	-	" S. T., Fusible	1.72

Double Pole—Porcelain Base—Type A.

Figure 544.

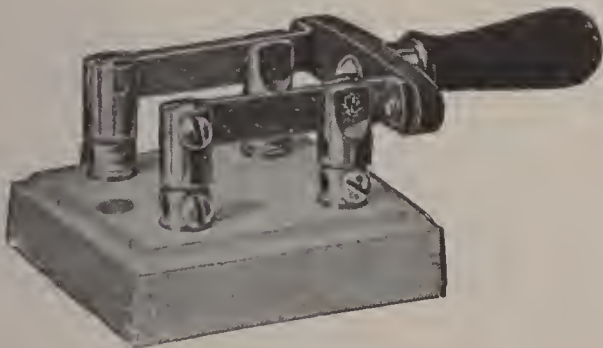


Figure 544.

15	Amperes,	-	D. P., S. T.	.50
25	"	-	" "	.60
15	"	-	" D. T.	.74
25	"	-	" "	.90

Double Pole—Unmounted—Type A.

15	Amperes,	-	D. P., S. T.	.50
25	"	-	" "	.60
15	"	-	" D. T.	.74
25	"	-	" "	.90

SWITCHES (Continued).



Figure 545.

PERKINS PORCELAIN SWITCH.

Figure 545.
220 Volt.

10 Ampere, Double Pole,	\$1.08	10 Ampere, Single Pole,	\$0.72
10 " Three-Point,	1.08	10 " Four-Point,	1.08

Unless otherwise ordered, this switch is furnished in plain white porcelain, but it can be finished with any desired decoration, prices for which will be given on application.

GIBBS THREE-POLE SWITCH.

Figure 546.
220 Volt.

15 Ampere, Three Pole,	\$1.80	15 Ampere, Three Pole. Lock Attachment,	\$1.98.
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This switch breaks simultaneously, the three wires (each at two points) when used with the Edison three-wire system.

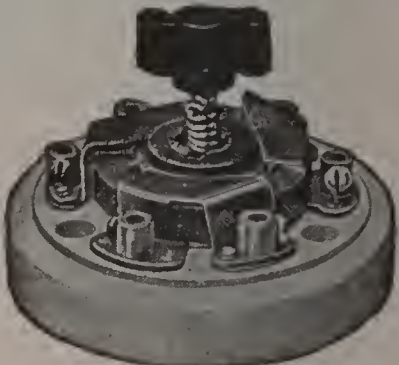


Figure 546.

PERKINS FLUSH SWITCHES.

220 Volt.
Figure 547.

Push Button Switch.
Complete with Face Plate.

10 Ampere, Single Pole...	\$1.90
10 Ampere, Double Pole.....	\$2.40
10 Ampere, Three Way.....	\$2.40
10 Ampere, Four Way.....	\$4.00

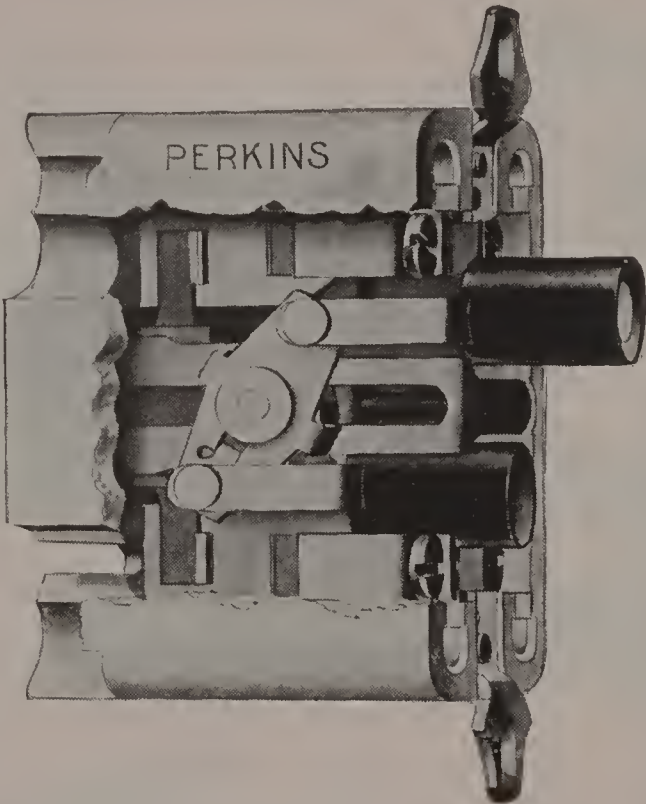


Figure 547.

Gang Push Button Switch.

No Plates or Frames.
Figure 547.

10 Ampere, Single Pole.....	\$1.50
10 Ampere, Double Pole.....	\$2.00
10 Ampere, Three-Way.....	\$2.00
10 Ampere, Four-Way.....	\$3.60



Figure 548.

Gang Push Button Switch, Double Pole.

THE BRYANT STANDARD SWITCH.

Patented October 23, 1888,
and October 30, 1888.

Single Pole.

15 Ampere, concealed,	\$0.80
25 " " "	1.08
15 " grooved.	0.80
25 " " "	1.08



Figure 549,

Double Pole.

10 Ampere, concealed,	\$0.94
15 " " "	1.34
25 " " "	1.60
10 Ampere, grooved.	0.94
15 " " "	1.34
25 " " "	1.60

SWITCHES (Continued).



Figure 550.

PERKINS FLUSH SWITCHES.

Figure 550.

220 Volt.

15 Ampere, Double Pole.....	\$2.16
30 " " 	2.88
15 " Triple Pole.....	3.36

The above switches can be furnished in gangs to order.



Figure 551.

PERKINS FLUSH SWITCHES.

Figure 551.

220 Volt.

Porcelain Cup Switch.

5 Ampere, Single Pole.....	\$1.15
10 " " 	1.24
10 " Double Pole.....	1.58
5 " Three-Point.....	1.35
10 " " 	1.58
10 " Four-Point.....	1.58
10 " Electrolier.....	1.58

When specified, these switches can be furnished to fit Har & Hegeman, Anchor or Cutter wall boxes.

5 or 10 Ampere switches can be placed in this porcelain cup, absolutely insulating all parts of the switch.

SWITCHES (Continued).



Figure 552.



Figure 553.

Pendant Push Button Switches.

The Pendant Push Button Switches are particularly adapted for use in connection with either permanent or temporary installations of incandescent lamps or fan motors. In locations where exposed wiring is necessary, the drop cord offers an arrangement of wiring much neater than can be obtained with the wall switch.

The most desirable position for a fan motor is frequently not the most accessible, and in such cases conveniently located separate switches are desired.

Switches are made for 5 and 10 amperes. They are models of strength and durability, and the construction is unusually compact and effective. The brass casing surrounds a porcelain body on which are mounted the terminals, contacts, and working parts of the switch. All contact surfaces are liberally proportioned and the mechanism of the switch is thoroughly reliable.

The circuit is closed by pushing the rubber button which is attached to a metallic plunger, and is quickly opened by pressure on the release button at the side of the switch.

The 5 ampere switch is 1 5/8 inches in diameter, and the 10 ampere switch 1 7/8 inches. The standard finish for switches of both sizes is polished brass.

DESCRIPTION.	LIST PRICE.
Pendant Push Button Switch, 5 Ampere, 125 Volts.	\$.70
Pendant Push Button Switch, 10 Ampere, 125 Volts.	1.00

PORTABLE ELECTRIC TOOL GRINDER.



Figure 554.

This machine consists of an Electric Motor (Direct or Alternating Current) mounted on a specially designed base, with two emery wheels, one 4-inch and one 5-inch, attached to either end of the shaft.

The machine can be handily mounted on any work bench or lathe bed, or in proximity to any machine tool, and connected by flexible cable to an ordinary incandescent lamp socket. It can readily be shifted from place to place and requires no other mounting than that with which it is supplied.

PRICE LIST OF PORTABLE ELECTRIC TOOL GRINDER.

Complete with Base Plate, Grinding Rests and Emery Wheels.

Circuit	Frequency.	Voltage.	Weight.		Price.
			Net.	Boxed.	
D. C.	.....	100 125	31 lbs.	45 lbs.	\$42.00
D. C.	.....	200-250	31 lbs.	45 lbs.	45.00
A. C.	7200	100-115	31 lbs.	45 lbs.	45.00
A. C.	16000	100-115	31 lbs.	45 lbs.	45.00

PORTABLE ELECTRIC CLEANER AND BUFFER.

Complete with 4-inch Steel Wire Scratch Wheel and 5-inch Buffing Wheel.

Circuit.	Frequency	Voltage.	Weight		Price.
			Net.	Boxed.	
D. C.	.....	100 -125	15 lbs.	27 lbs.	\$40.00
D. C.	.....	200-250	15 lbs.	27 lbs.	43.00
A. C.	7200	100 115	15 lbs.	27 lbs.	43.00
A. C.	16000	100-115	15 lbs.	27 lbs.	43.00

All machines complete with Switch, Flexible Cord and Plug, ready to start.
Special discount on orders of 10 machines for large factories.

STANDARD SOCKETS.



Figure 555.

Fibre Lined—250 Volt.

Edison	Key	Socket,	$\frac{1}{8}$ -inch	Cap,	\$0.33
"	"	"	$\frac{3}{8}$	"	.39
"	Keyless	"	$\frac{1}{8}$	"	.30
"	"	"	$\frac{3}{8}$	"	.36

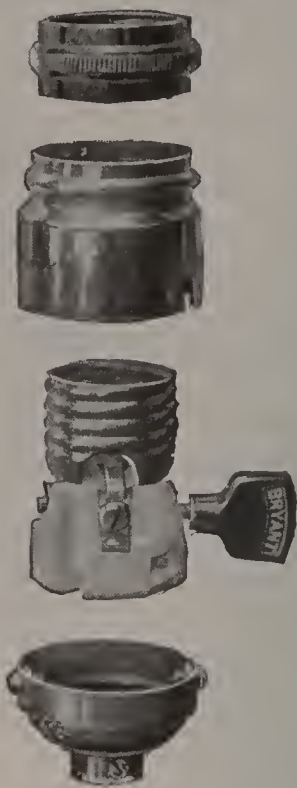


Figure 556.

Removable Ring.

Fibre Lined—250 Volt.

Edison	Key	Socket,	$\frac{1}{8}$ -inch	Cap,	\$0.35
"	Keyless	"	$\frac{1}{8}$	"	.32
"	Key	"	$\frac{3}{8}$	"	.41
"	Keyless	"	$\frac{3}{8}$	"	.38

Fibre Lined—250 Volt.

Thomson-Houston	Base,	Key,	$\frac{1}{8}$ -in.	Cap,	\$0.33
"	"	"	$\frac{3}{8}$	"	.39
"	"	Keyless	$\frac{1}{8}$	"	.30
"	"	"	$\frac{3}{8}$	"	.36



Figure 558.

Acorn Socket—Removable Ring.

Unlined—110 Volt

Figure 558.

Edison	Keyless	Socket.....	$\frac{1}{8}$ -in.	Cap,	\$0.38
"	"	"	$\frac{3}{8}$	"	.44

Fibre Lined—250 Volt.

Figure 558.

Edison	Keyless	Socket.....	$\frac{1}{8}$ -in.	Cap,	.38
"	"	"	$\frac{3}{8}$	"	.44

Fibre Lined—250 Volt.

Figure 557.

Westinghouse	Base,	Key...	$\frac{1}{8}$ -inch	Cap,	.33
"	"	"	$\frac{3}{8}$	"	.39
"	"	Keyless	$\frac{1}{8}$	"	.30
"	"	"	$\frac{3}{8}$	"	.36



Figure 557.



STANDARD SOCKETS (Continued).



Figure 559.

All Porcelain,
Edison Base, Keyless Chocolate Porcelain, \$0.25
Edison Base, Key, Chocolate Porcelain... .30



Figure 560.

PULL SOCKET.

Figure 561.

Pendant Pull Socket.

Fibre Lined—250 Volt.

Edison	Screw	Base	1⁄8-in.	Cap, \$0.65
"	"	"	3⁄8-in.	" .71
Thomson-Houston		"	1⁄8-in.	" .65
"	"	"	3⁄8-in.	" .71
Westinghouse		"	1⁄8-in.	" .65
"		"	3⁄8-in.	" .71



Figure 561.

EDISON WALL SOCKETS.

Fibre Lined—250 Volt.

Figure 562.

Edison Key Wall Socket.....	\$0.44
Edison Keyless Wall Socket.....	.40

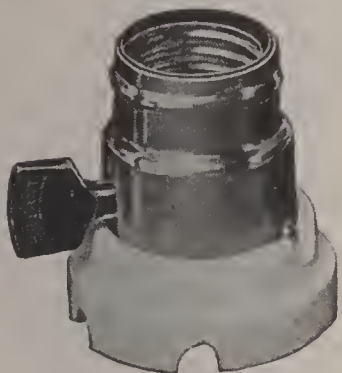


Figure 562.

With Removable Ring and Concealed Base.
Unlined—110 Volt.

Figure 563. Edison Base, Key..	.....	\$0.44
Figure 565. " " Keyless.....		.40



Figure 563.



Figure 565.

Fibre Lined—250 Volt.

Figure 564. Edison Base, Key....	.60
Figure 566. " " Keyless, \$0.55	



Figure 564.



Figure 566.

WEATHERPROOF SOCKETS.



Figure 567.

BRYANT SOCKET.

Edison Screw Base	\$0.30
Thomson-Houston Base.....	.30
Westinghouse Base	.30

Each socket fitted with twelve inches of wire. Special length wire to special order.



Figure 568.

THE BRAGDON SOCKET.

Edison Base	\$0.50
Thomson-Houston Base.....	.50
Westinghouse Base.....	.50

Extension edge carries the drip away from the lamp and socket.

Method of wiring at the top removes the strain from the socket itself and places it on the porcelain.

Extra hole in porcelain at top allows for suspension by cord if desired.

Each socket fitted with twelve inches of stranded rubber covered wire. Extra length wires furnished to special order.

THE CHAPMAN RECEPTACLE.

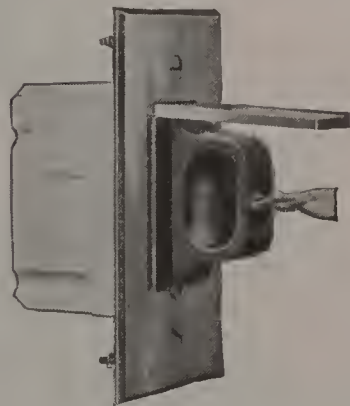


Figure 569.

Complete with Lid and Plug.....	\$2.70
“ “ Plug no Lid.....	2.40

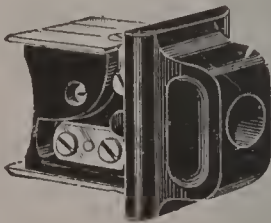


Figure 570.

Plug only.....	\$1.10
Receptacle only, with Lid,	1.60
“ “ no “	1.30

Prices cover light bronze, polished brass and nickel face plates. Special finishes to order.

FIXTURE CUT-OUTS.

The Bug Cut-Out.

Concave-head contact screws in the base, and convex in the cap, insure a perfect contact where the two connecting wires are of different gauge.

The cover, being held in place by but one nut, can be readily removed for fusing.



Figure 571.

Covered.



Figure 572.

Open.

List Price.....\$0.18

K.-W. ROSETTES.

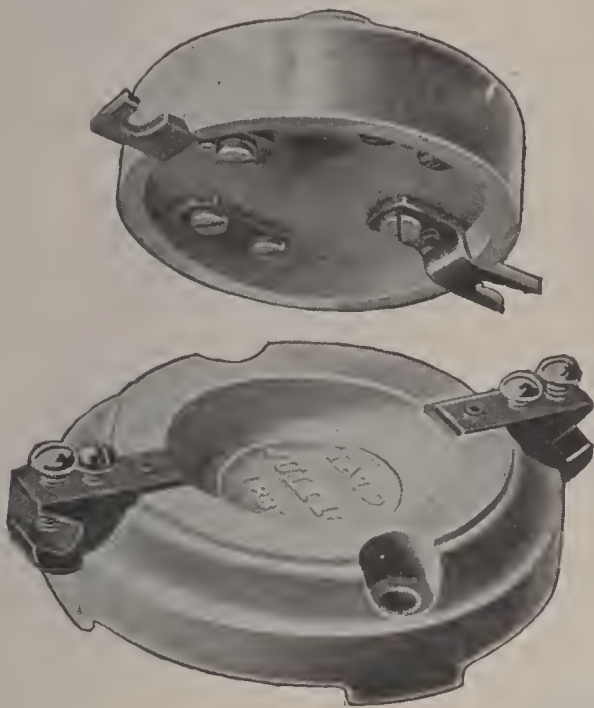


Figure 573.
Cleat, with Cast Lugs.

List Price..... \$0.28

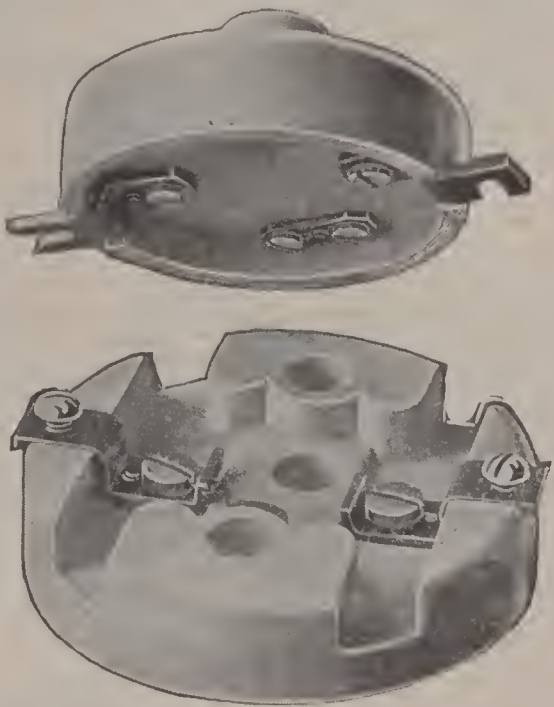


Figure 574.
For Combination Work.

G.-E. ROSETTES.

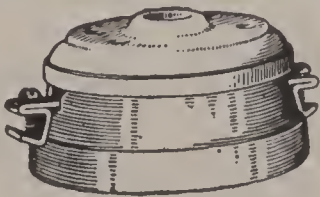


Figure 575.

List Price..... \$0.28

K. P. FUSELESS ONE-PIECE ROSETTE.

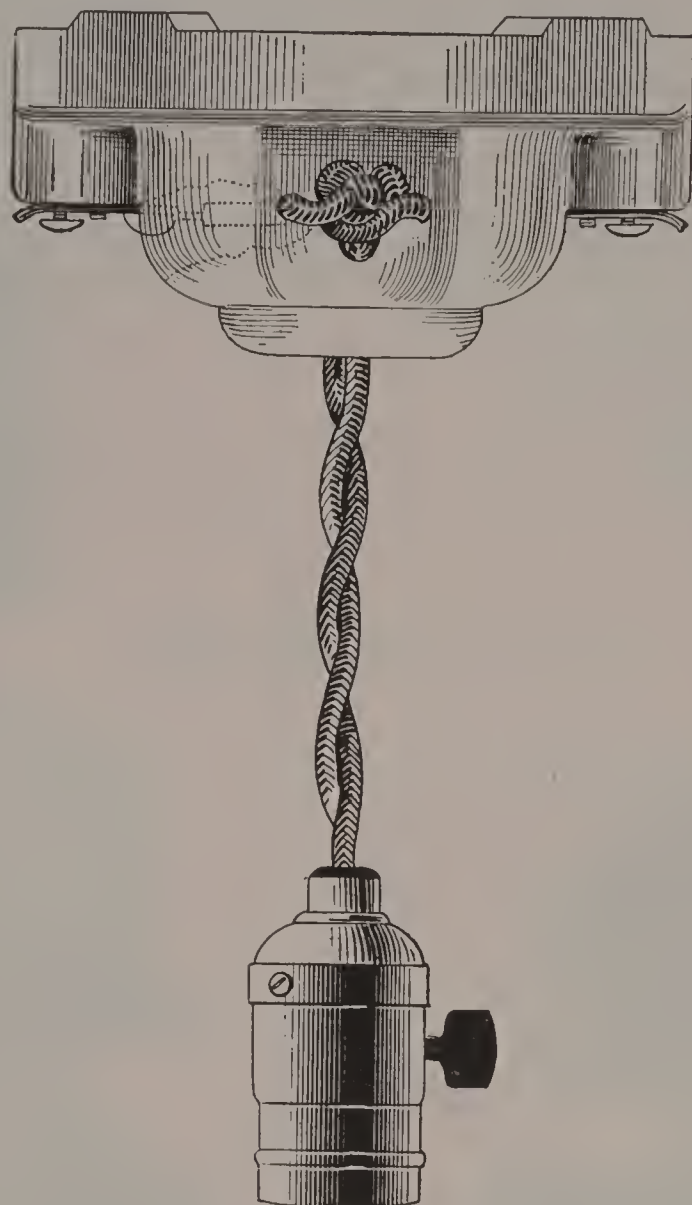


Figure 576.

Approved by National Board of Fire Underwriters.

FEATURES.

FIRST.—It is made of one solid piece of finest porcelain, therefore

- (a) Always a complete rosette; easy to handle.
- (b) Never any useless, unmatched parts.

SECOND.—Easiest and cheapest to connect of any rosette made, all contacts being readily accessible.

THIRD.—All weights and strains borne by knot supported by solid porcelain; absolutely no strain on contacts.

10 in a package. 500 in a case.

List Price, 16 cents each.

CARTRIDGE FUSE CUT-OUTS.

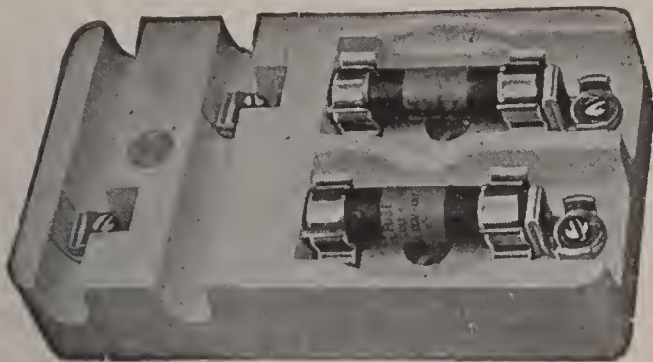


Figure 577.

Double Pole, Single Branch. 220 Volt, 30 Ampere.

Practical experience has demonstrated that an arc caused by opening a circuit should be entirely enclosed, and this principle has been adopted by a simple construction in the cartridge fuse cut-outs. The fuse passes from ferule to ferule through a fire-proof compound which is encased in a tube of tough insulating material. As soon as the fuse blows, the compound closes the path and renders an arc impossible.

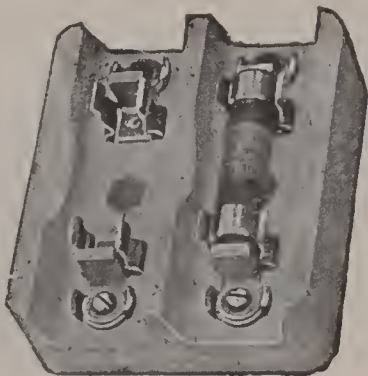


Figure 578.

LIST PRICE.

Figure 577.....	\$1.00
" 578.....	.70

EDISON PLUG CUT-OUTS.

For the Protection of Circuits having a Maximum Current of 30 Ampere, and a Maximum Potential of 125 Volts.

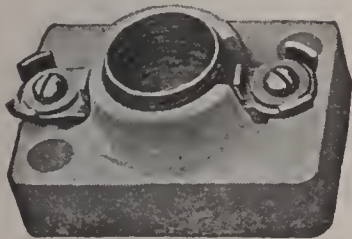


Figure 579.

Single Pole Main. 125 Volts.



Figure 580.

Double Pole Main.



Figure 581.

Double Pole, Single or Double Cross over Branch.

LIST PRICE.

Figure 579.....	\$0.25
" 580.....	.40
" 581.....	.50
" 582.....	.45
" 583....	.85

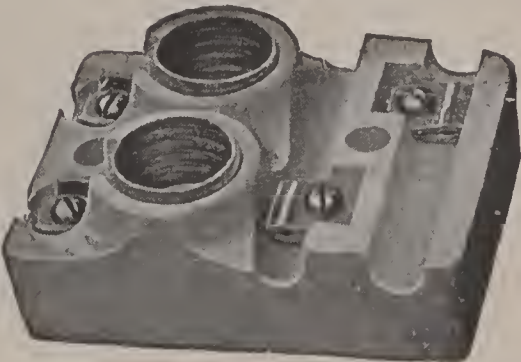


Figure 582.

Double Pole, Single Branch.



Figure 583.

Double Pole, Double Branch.

FUSE PLUGS.

Figure 584.

For Use with Edison Plug Cut-Outs.

3 Ampere, Fuse Plug.	15 Ampere, Fuse Plug.
6 " " "	20 " " "
10 " " "	25 " " "
12 " " "	30 " " "

List Price..... \$0.09



Figure 584.

60 AMPERE PLUG CUT-OUTS.

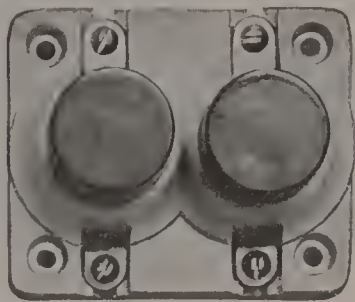


Figure 585



Figure 586.

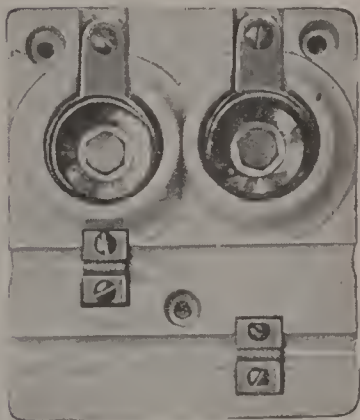


Figure 587

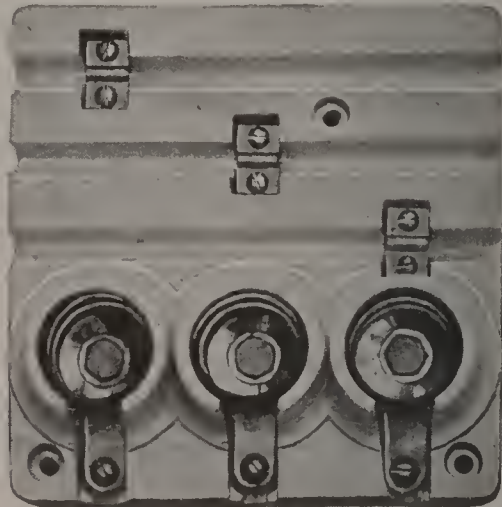


Figure 588.

Main Line and Branch Cut-Outs.

The Edison Plug Cut-outs, which have been for so many years the standard indoor wiring device, are now manufactured with an increased capacity. The cut-out is strong and compact, with current carrying parts of ample capacity. The screw shell is of the same general design as that of the smaller cut-outs, but is slightly deeper and has a greater diameter. The entire body of the plug is of porcelain, and is constructed on the well-known and successful cartridge fuse principle, but retains all of the characteristics of the Edison plugs. The metal cap is thoroughly insulated with composition, and can be readily removed for inspection of the fuse strips. The plugs are neat in appearance and are made for 250 volt circuits, in capacities ranging from 10 to 60 amperes.

Capacities ranging from 10 to 60 amperes.

EDISON PLUG CUT-OUTS AND FUSE PLUG CUT-OUTS.

DESCRIPTION.	Standard Package.	List Price.
Figure 585. Edison Plug Cut-out, 60 Amp., 250 Volts, Double Pole, Main Line	50	\$1.50
Figure 586. Edison Plug Cut-out, 60 Amp., 250 Volts, Triple Pole, Main Line	50	2.25
Figure 587. Edison Plug Cut-outs, 60 Amp., 250 Volts, Double Pole, Single Branch.....	50	1.75
Figure 588. Edison Plug Cut-outs, 60 Amp., 250 Volts, Triple Pole, Single Branch.....	25	3.00

FUSE PLUGS FOR USE WITH THE ABOVE CUT-OUTS.

Edison Fuse Plug, 10 Amperes.....	50	.30
“ “ “ 20 “	50	.30
“ “ “ 30 “	50	.30
“ “ “ 40 “	50	.30
“ “ “ 50 “	50	.30
“ “ “ 60 “	50	.30

500 VOLT RAILWAY CUT-OUTS.



Figure 589.



Figure 590.

Single Pole.

Figure 589.

25 Ampere	.....	Porcelain Cover.	\$0.50
25	"	Mica	.50
50	"	Porcelain	.80
50	"	Mica	.80
100	"	Porcelain	1.20
100	"	Mica	1.20

Length of break :

25 Ampere	.....	23 ¹ / ₄ -inches
50	"	31 ¹ / ₄ "
100	"	4 "

Double Pole.

Figure 590.

10 Ampere, Mica Cover.....	\$0.40
10 " Porcelain Cover.....	.40

Length of break, 3 inches.

FUSE FITTINGS.

For Cartridge Fuses.

250 VOLT PORCELAIN SPRING CLIP CUT-OUTS.

TYPE C CONTACT.

For Interior Wiring.



Figure 591.

LIST PRICE.

	Stand- ard Pkgs.	List Price.
Double pole main line cut-out ..	50	\$.70
Triple pole main line cut-out	50	.85
Double pole single branch cut-out.....	50	1.00
Triple pole single branch cut-out.....	25	1.50

FUSE FITTINGS (Continued).

CARTRIDGE FUSES, 250 VOLTS.

Type C or Spring Clip Contact. Standard Package 25 Fuses.

Continuous Load Current.	Price per 100.	Continuous Load Current.	Price per 100.
3 Amperes	\$20.00	12 Amperes	\$20.00
4 "	"	15 "	"
5 "	"	18 "	"
6 "	"	20 "	"
8 "	"	25 "	"
10 "	"	30 "	"

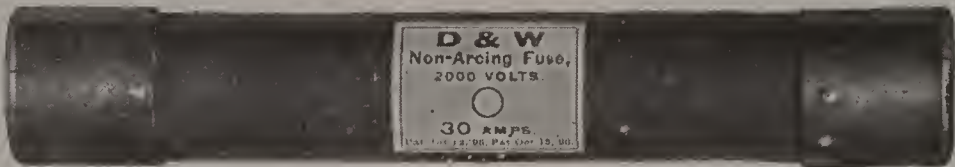


Figure 592.
Type C Contact Fuse.

FUSES FOR 500 VOLT SERVICE.

For Use on Circuits from 250 Volts to 500 Volts.

Standard Package 25 Fuses.



Continuous Load Current.	Price per 100	Continuous Load Current.	Price per 100.
Will Fit Only 10 Ampere Base.		35 Amperes	\$38.00
2 Amperes	\$27.00	40 "	"
4 "	"	45 "	"
6 "	"	50 "	"
8 "	"	Will Fit Only 100 Ampere Base.	
10 "	"	60 "	48.00
Will Fit Only 25 Ampere Base.		75 "	"
12 "	34.00	100 "	"
14 "	"	125 "	"
16 "	"	Will Fit Only 300 Ampere Base.	
18 "	"	150 "	68.00
20 "	"	200 "	"
25 "	"	250 "	"
30 "	38.00	300 "	"
Will Fit Only 50 Ampere Base.			

Figure 593.

FUSE FITTINGS (Continued).
For Cartridge Fuses.

MOTOR TYPE CUT-OUTS.

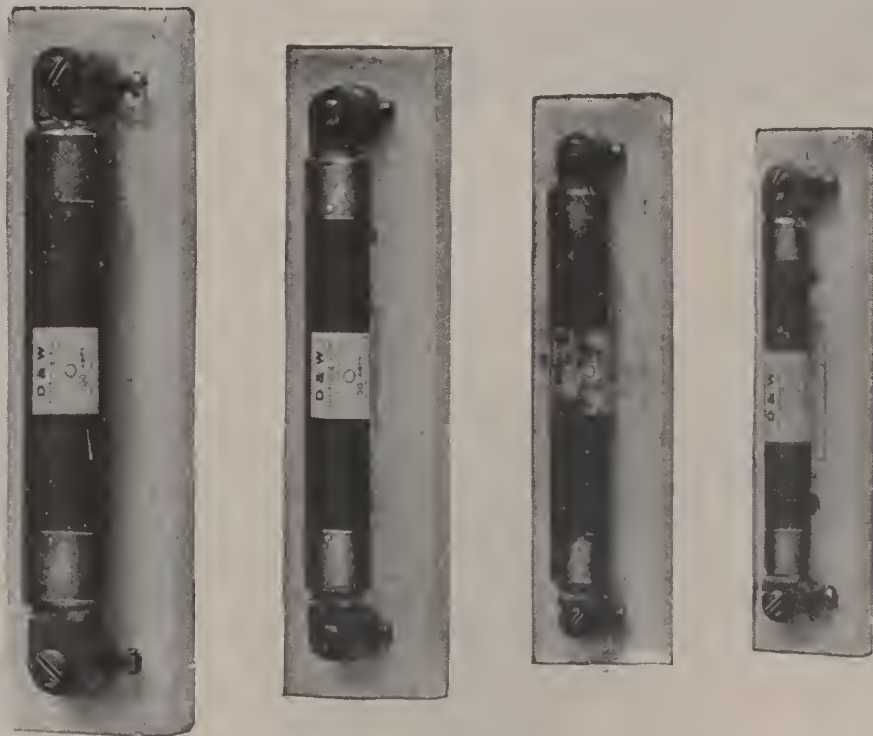


Figure 594.

Single Pole 500 Volt Porcelain Cut-Outs.

List Price.		List Price.
10 Ampere Cut-Out (2 to 10 Am- peres inclusive)	\$.90	peres inclusive) 1.20
25 Ampere Cut-Out (12 to 25 Am- peres inclusive)	1.00	100 Ampere Cut-Out (60 to 125 Am- peres inclusive) 1.70
50 Ampere Cut-Out (30 to 50 Am- peres inclusive)		300 Ampere Cut-Out (150 to 300 Amperes inclusive) 2.30

DUPLEX FEEDER SLATE CUT-OUT.

For Indicating Cartridge Fuses.

TYPE A OR SCREW CLAMP CONTACT.

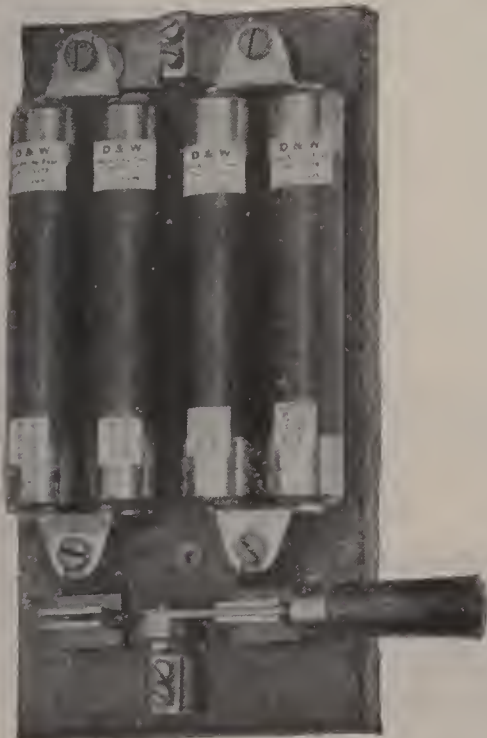


Figure 595.

Description.	Distance on Centres.	Package Quantity.	List Price.
Capacity 5 to 200 Amperes, 250 or 500 volts, or 5 to 120 Amperes, 1,000 or 2,000 volts.	7½ in.	50	\$6.00

COMMUTATOR COMPOUND AND TAPE.



Figure 596.

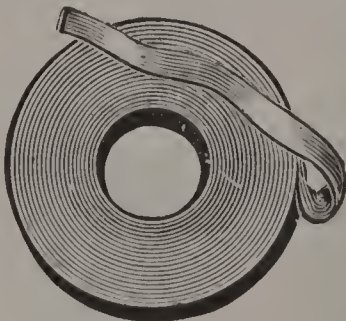


Figure 597.

COMPOUND.

	Price.
Gale's Commutator Compound per stick.....	\$0.75

TAPE.

	Price.
Competition, 1½ lb. rolls, per lb.....	\$0.80
Grimshaw, white ".....	1.00
Grimshaw, black ".....	1.10
Okonite, ".....	1.50
Lenox, all rubber splicing tape, per lb.....	.75
Cloth base rubber insulating tapes ¾ in. wide.	

P. and B. COMPOUND.

	Pint Cans.	Quart Cans.	1 Gallon Cans.	5 Gallon Cans.	—Per Gallon in— ½ Bbls.	Barrels.
1st Grade	\$0.30	\$0.50	\$1.75	\$8.00	\$1.55	\$1.50
2d "	.25	.45	1.50	7.00	1.30	1.25

SOLDERING APPLIANCES.



Figure 598.

WIRE SOLDER.

	Price.
Wire Solder	\$0.40
Rosin Core Solder.....	.50

SOLDERING COPPERS, POINTED.



Figure 599.

2½ lbs. to the pair, per lb.....	\$0.48
3 " " " "	.48
4 " " " "	.48
5 " " " "	.48

SOLDERING SALTS.

	Price Each.
In ½ lb. bottles, per lb	\$0.75
In 1 " " " "	.65
In 5 " " " "	.50

SOLDERING PASTE.

	Price Per Box
In boxes containing 2 oz.....	\$0.50
In " " 1 lb.....	2.00
In " " 5 lbs.....	10.00

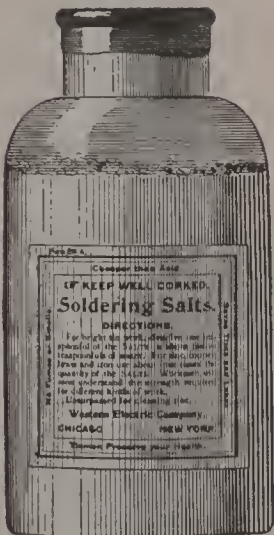


Figure 600.

THE ALLEN SOLDERING
STICK.

Per stick 25

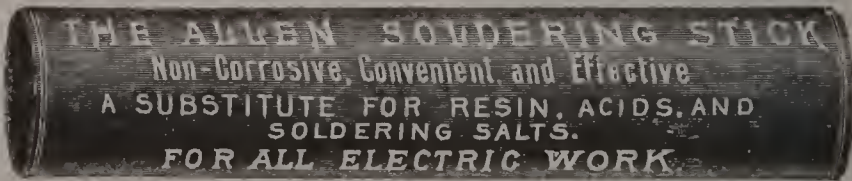


Figure 601.

SOLDERING APPLIANCES (Continued).

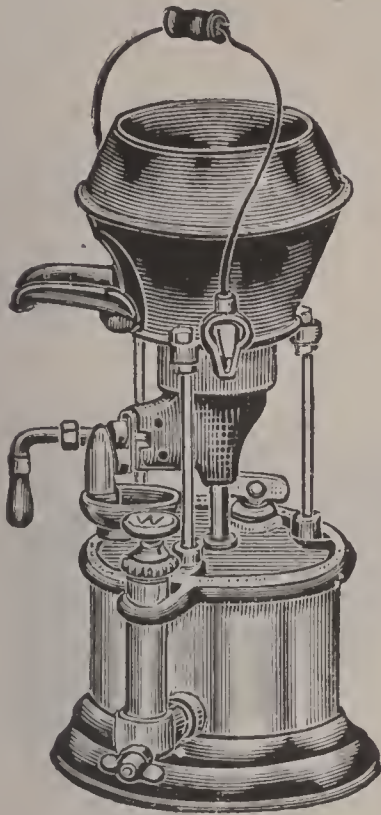


Figure 602.

Combination Hot Blast
Furnace.....\$10.00

Helper's Firepot. Can
also be used as a re-
versible torch.....10.00

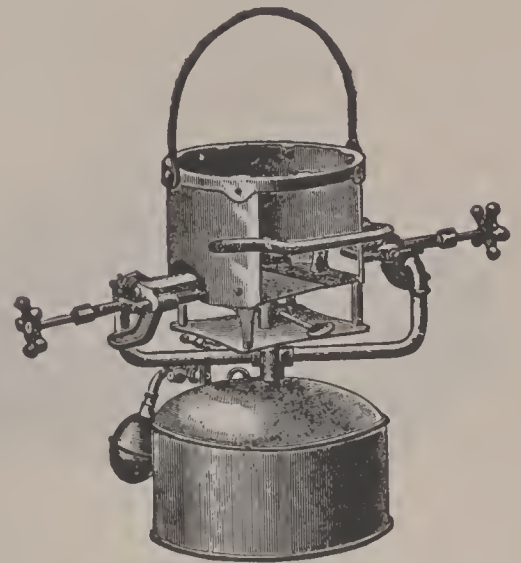


Figure 603.

TORCHES.

Everybody who uses a torch
in his work will be interested in the

IMPROVED ALCOHOL TORCH.

You can get the point of the
blow pipe flame exactly where you
want it.

Price \$3 00

GASOLINE TORCH.

Three useful tools in one;
a brazier, soldering iron heater and
blow torch for plumbers, electric-
ians and conduit workers. Will
not blow out.

Price, each..... . \$6.00

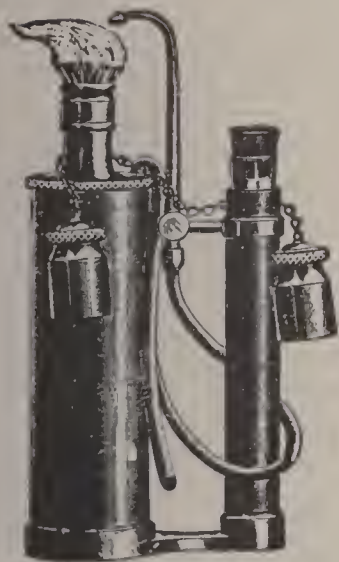


Figure 604.

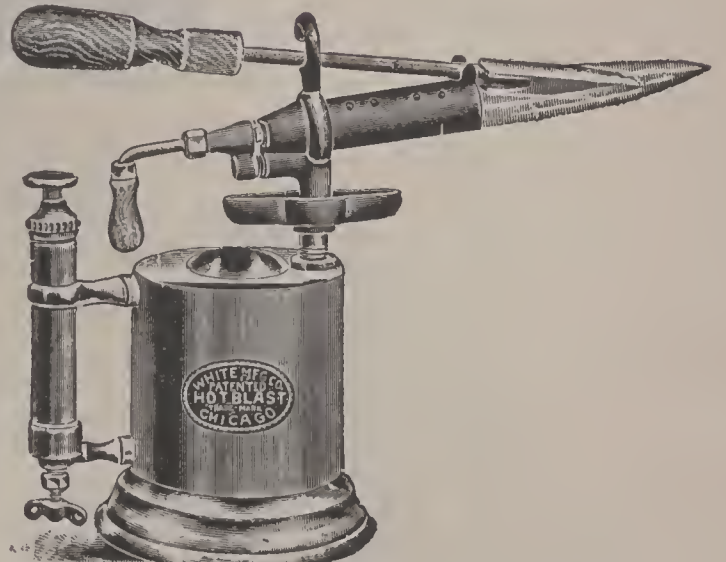


Figure 605.

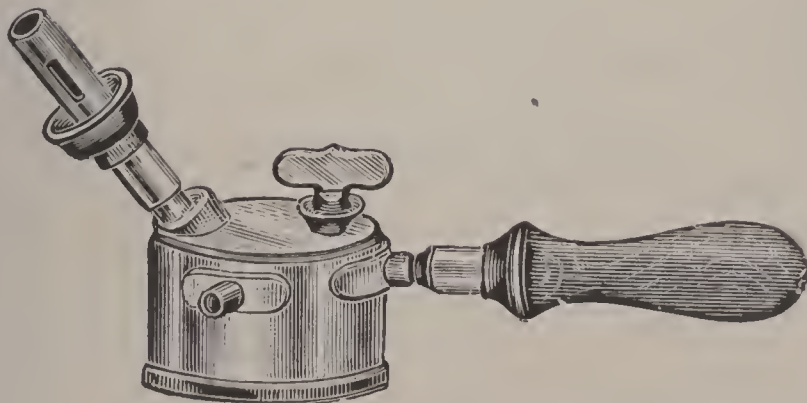


Figure 606.

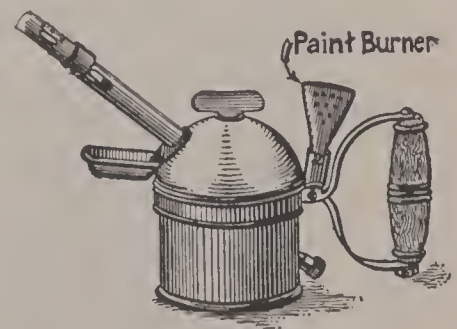


Figure 607.

List Price
Each.

Vulcan Torch.....\$5.00

List Price
Each.

Queen's Torch..... \$6.00

LIGHTNING ARRESTERS.

Single Pole Line Arresters.

Circuit Voltage.	List Price
125 to 700.....	Each. \$6.00

STANDARD FUSES.

and Fuse Wire.
All Sizes Carried in Stock.

DYNAMO BRUSHES.

We supply promptly Carbon and Gauze Brushes of any size.

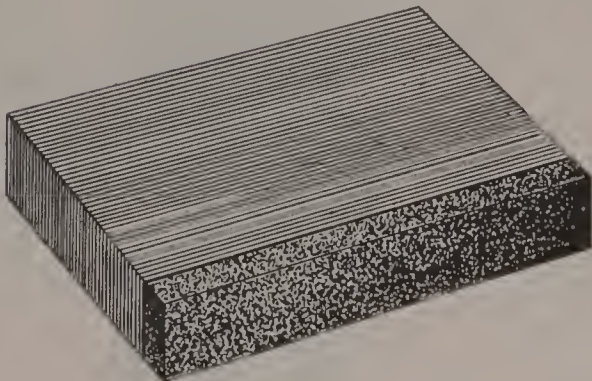


Figure 608.

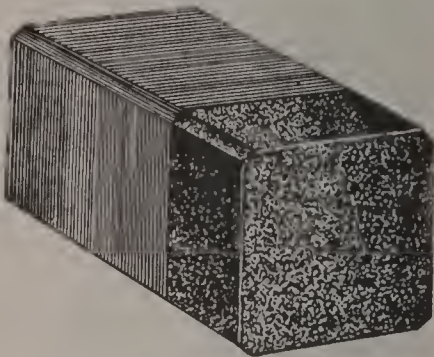


Figure 609.

Carbon Brushes.



Figure 610.
Wire Gauze Brush.

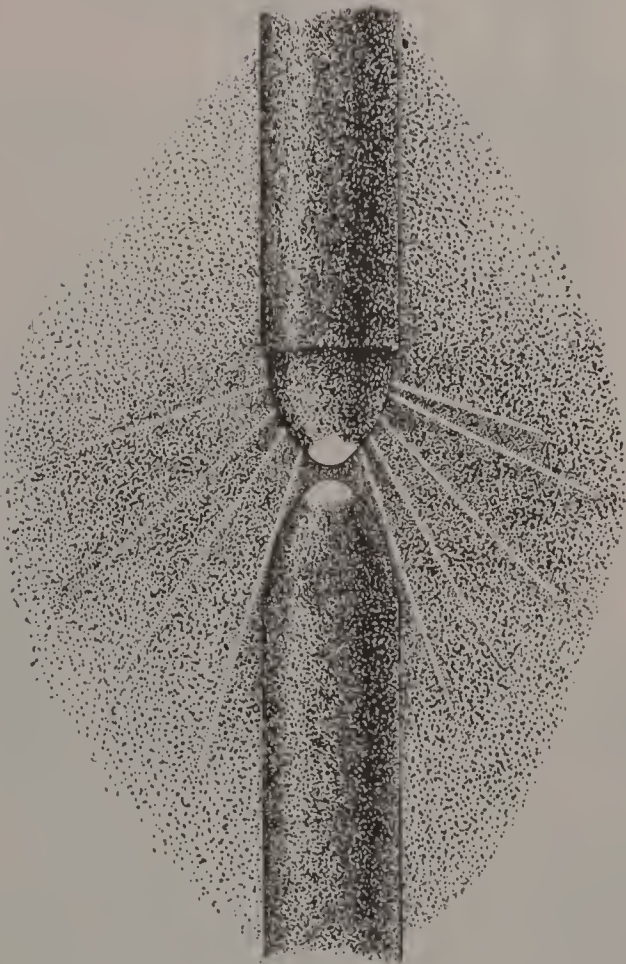


Figure 611

CARBONS.

For Enclosed Arc Lamps. (Best Quality.)
Quick Shipments made from Stock.

WIRE.

Approximate Weight and Measurements of Triple Braided
Weatherproof Copper Wire.

Size B. & S. Guage	Feet per Pound.	Lbs. per 1000 Ft.	Lbs. per Mile.
0000	1.30	767	4050
000	1.59	629	3320
00	2.02	495	2610
0	2.45	407	2150
1	3.22	310	1640
2	4.00	250	1320
3	5.03	199	1050
4	6.10	164	865
5	7.43	135	710
6	9.00	111	587
8	13.54	74	390
10	18.85	53	280
12	28.54	35	185
14	40.61	25	130
16	60.00	17	88
18	75.43	13	70

Sizes 0000 to 14 B. & S. always in stock.

RUBBER COVERED WIRE

Carried in Stock in the following Sizes:
Numbers 14, 12, 10, 8, 6, 4, 2, 1, 0, 00, 000, 0000.

ANNUNCIATOR WIRE.

Annunciator Wire—Single.

No.	Feet per lb.	Price per lb.
16	105.....	\$0.45
18	155.....	.46
19	200.....	.48
20	239	.50

Wound on spools containing about 8 lbs. each. Assorted colors,

LAMP CORD AND CABLES.

INCANDESCENT LAMP CORD.
For Drop Lights, Brackets, Portables, Etc.



Figure 612,.

Conductor composed of Fine Wires, Insulated with Rubber and Braided Silk, or Cotton.

Two Conductors, Twisted, Covered with Silk or Cotton Braid, in different colors or combination of colors.

Equal in Conductivity to			Silk per yard	Cotton per yard
No. 20 B. & S.			\$.12	\$.07
" 18	"		.16	.09
" 16	"		.19	.12
" 14	"		.29	.21
" 12	"		.40	.32
" 10	"		.50	.42

Extra heavy Rubber Insulated Lamp Cord, No. 18, Cotton Braid, for Show Window Drop Light per yard, \$.68

BARE AND INSULATED

Double Galvanized Telegraph and Telephone Wire.

We are always prepared to furnish, in any quantity, the very best galvanized wire in the American market for telegraph and telephone lines.

No. 16 comes in 1 mile coils, the larger sizes one-half mile to coil. Quotations are made for full coils; if smaller quantity, add double the price.

Standard Weight and Resistance of Galvanized Wire.

Number, Roebling Gauge.	Diameter in Inches.	Weight in pounds per Mile.	Put up in bundles of	Approximate breaking strain in pounds.			Average resistance in Ohms at 68° F.			Price List Cents per lb.		
				E. B.B.	B. B.	Steel.	E. B.B.	B. B.	Steel	E. B.B.	B B	Steel.
4	.225	730	¼ mile	2,190	2,409	2,701	6.44	7.53	8.90	10¼	9	7
6	.192	540	⅓ "	1,620	1,782	1,998	8.70	10.19	12.04	10¼	9	7
8	.162	380	½ "	1,140	1,254	1,406	12.37	14.47	17.10	10¼	9	7
9	.148	320	½ "	960	1,056	1,184	14.69	17.19	20.31	10¼	9	7
10	.135	260	½ "	780	858	962	18.08	21.15	25.00	10½	9¼	7¼
11	.120	214	½ "	642	706	792	21.96	25.70	30.37	10½	9¼	7¼
12	.105	165	½ "	495	545	611	28.48	33.33	39.39	10¾	9½	7½
14	.080	96	½ "	288	317	355	48.96	57.29	67.71	11¼	10	8
16		62	1 "								15	

Special Prices quoted on large quantities on application.

FLEXIBLE CONDUIT WIRE.

Inside Diameter.	Feet in Coil.	Weight per 1,000 feet.	Cubic feet per Coil.	Price per foot.
¼ in.	250	75 lbs.	1.18	6 cts.
⅜ in.	250	110 lbs.	1.38	7 cts.
½ in.	200	125 lbs.	1.58	8 cts.
⅝ in.	200	155 lbs.	2.28	10 cts.
¾ in.	150	200 lbs.	2.38	12 cts.
1 in.	100	275 lbs.	2.48	16 cts.
1¼ in.	100	360 lbs.	3.74	20 cts.
1½ in.	Odd Lengths.	400 lbs.	....	34 cts.
1¾ in.	" "	440 lbs.	....	40 cts.

ONE WIRE CLEATS.

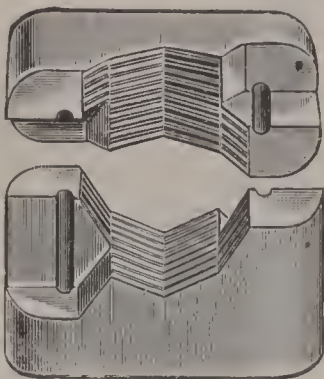
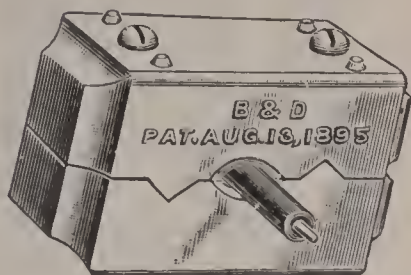


Figure 613.

Regular Style.

Size Wire. B. & S. Gauge.	Size Hole. Inches.	Price per 1000. Regular.	Price per 1000. Style "A"	Size Wire. B. & S Gauge.	Size Hole. Inches.	Price per 1000. Regular.	Price per 1000. Style "A"
10	1/4	\$ 26.68	\$36.68	200,000 c. m.	5/8	80.00	95.00
2	5/8	40.00	50.00	300,000 c. m.	3/4	120.00	120.00
0	3/8	48.00	60.00	500,000 c. m.	1	160.00	160.00
4/0	1/2	48.00	60.00				

Style "A" is similar to the regular, but is one inch from bottom of groove to back of cleat.

TWO AND THREE WIRE CLEATS.



Figure 614.

Standard Package 1000.

Prices per 1000.

For Sizes of Wire to No. 12, B. & S. Gauge, \$26.00 glazed; \$20.00 unglazed.

WIRING KNOBS.

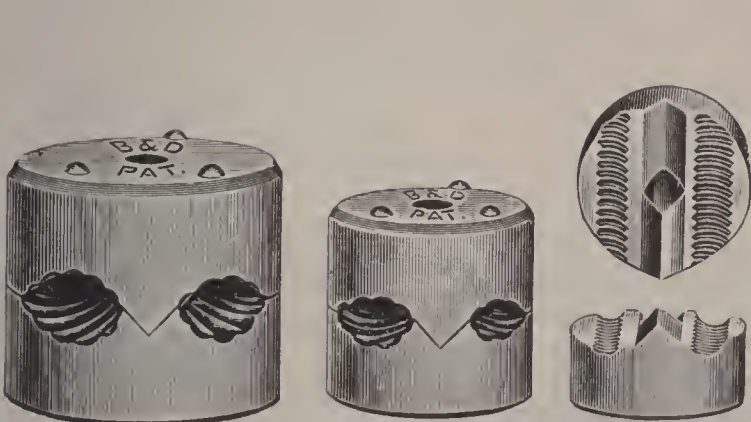


Figure 615.

Regular Style.

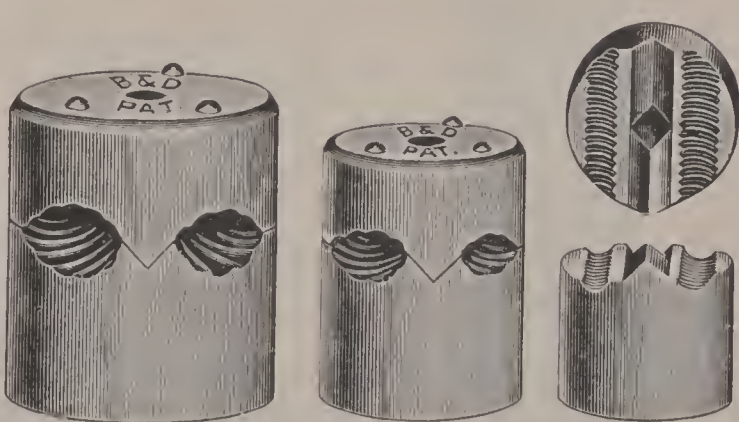


Figure 616.

Style A.

Prices per 1000.

For sizes of Wire to No. 10 B. & S. guage, \$26.68 regular; \$33.34 style A.

"	"	"	"	"	"	4	"	"	28.50	"	35.00	"
"	"	"	"	"	"	4/0	"	"	40.00	"	50.00	"

Style A has one inch below groove,

PORCELAIN INSULATORS.

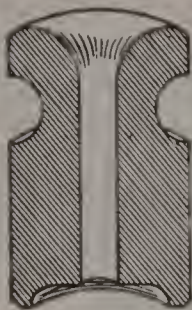


Figure 617.
Standard Pkg., 650
Price per M. \$88.00



Figure 618.
Standard Pkg. 850
Price per M \$41 34



Figure 619.
Standard Pkg.2,000
Price per M \$12.50



Figure 620.
Standard Pkg.5,000
Price per M \$10.00



Figure 621.
Standard Pkg.5,000
Price per M \$10.00



Figure 622.
Price per M \$90.00.



Figure 623.

CLAY AND SEMI-PORCELAIN
TUBES.

Lots of 1,000 and over, of one size, constitute a Standard Package quantity, and entitle the buyer to the Standard Package Discount.
List price per 1,000.

Size Hole.	Outside Dia- meter.	LENGTH UNDER HEAD.						
		1½	2	2½	3	4	6	8
5/16 in.	5/8 in.	\$6.66	\$7.00	\$8.32	\$8.32	\$10.82	\$24.16	\$36.66
3/8 "	1 1/8 "	7.50	8.82	10.00	10.82	13.32	28.32	43.32
1/2 "	3/4 "	8.32	10.82	12.00	13.32	15.66	31.66	50.00
5/8 "	1 "	11.00	13.50	14.82	16.66	20.00	34.24	56.66
3/4 "	1 1/8 "	12.62	16.00	18.32	21.76	24.16	41.66	61.66
1 "	1 1/4 "	15.00	18.32	21.66	27.16	32.50	46.32	66.66
1 1/4 "	1 3/4 "	.....	.....	.....	.....	80.00	100.00	120.00
1 1/2 "	2 "	.....	.....	.....	.....	100.00	160.00	200.00
1 3/4 "	2 1/2 "	.....	.....	.....	.....	120.00	213.32	240.00
		10	12	14	16	18	20	24
5/16 "	5/8 "	\$45.00	\$66.66	\$80.00	\$96.00	\$115.00	\$143.32	\$173.33
3/8 "	1 1/8 "	53.32	78.32	90.00	106.66	126.66	148.32	180.00
1/2 "	3/4 "	60.00	86.66	98.46	115.00	133.32	156.66	190.00
5/8 "	1 "	66.66	91.66	105.00	125.00	141.66	173.32	216.66
3/4 "	1 1/8 "	73.32	103.32	116.66	140.00	156.64	193.32	240.00
1 "	1 1/4 "	83.32	116.66	140.00	161.66	183.32	206.66	266.66
1 1/4 "	1 3/4 "	160.00	240.00	280.00	320.00	366.66	400.00	483.32
1 1/2 "	2 "	240.00	360.00	416.66	480.00	533.32	600.00	700.00
1 3/4 "	2 1/2 "	280.00	400.00	500.00	600.00	650.00	700.00	900.00

GLASS INSULATORS.



Figure 624.
Deep Groove.
Price per 100, \$5.00.



Figure 625.
Deep Groove, Double
Petticoat.
Price per 100, \$6.00.

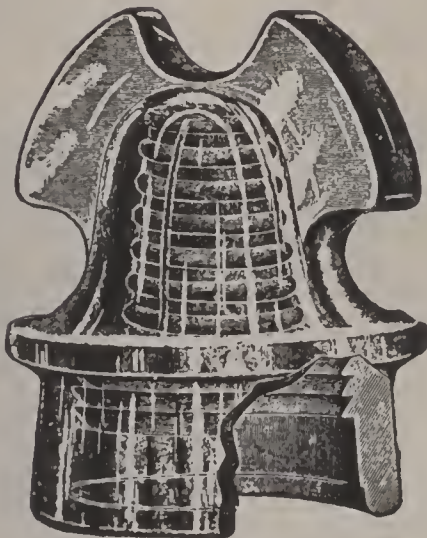


Figure 626.
Pony.
Price per 100, \$3.00.

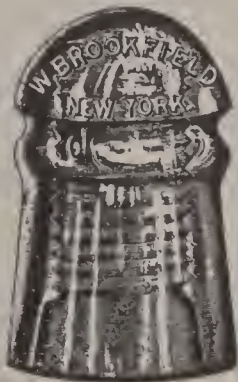


Figure 627.
Cable Glass Insulator.
Price per 100, \$10.00.

PINS AND BRACKETS.



Figure 628.

Oak	Brackets, Painted, Western Union Standard, per 100	.....	\$2.50
"	"	1 1/4 inch, per 100	 2.00
"	"	1 1/2 inch, " "	 2.00

OPAL SHADES FOR INCANDESCENT LAMPS.



Figure 629.
FLAT OPAL.

For 2¼ or 3¼ inch holders.

6 inch, per dozen	\$2.00	6 inch, per dozen	\$ 6.25
7 " " "	2.25	16 " " "	8.75
8 " " "	2.50	18 " " "	15.00
10 " " "	2.75	20 " " "	18.75
12 " " "	5.50	24 " " "	30.00



Figure 630.
FLUTED OPAL.

For 2¼ and 3¼ inch holders.

6 inch, per dozen	\$2.50
7 " " "	2.75
8 " " "	3.10
10 " " "	4.38
12 " " "	6.00

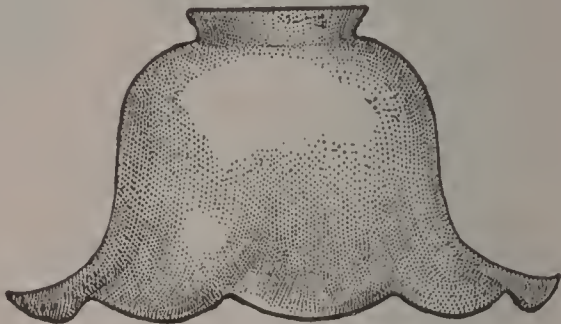


Figure 631.
SCALLOPED OPAL.

For 2¼ inch holder.

5 inch, per dozen	\$2.00
6 " " "	2.25
7 " " "	2.50
8 " " "	2.75
10 " " "	5.00

TIN SHADES AND REFLECTORS.

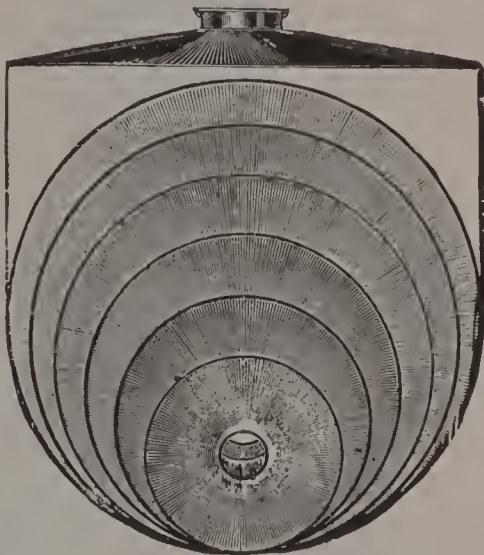


Figure 632.
PLAIN FLAT TIN SHADES.

For 2¼ and 3¼ inch holders.

8 inches, per dozen	\$1.60
10 " " "	2.25
12 " " "	3.25
14 " " "	3.75
16 " " "	5.00
18 " " "	6.00

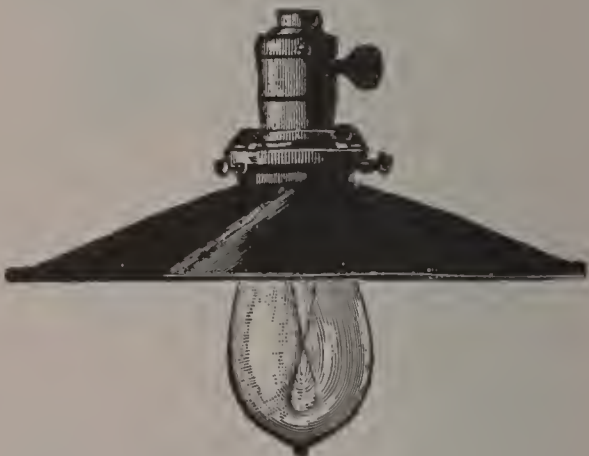


Figure 633.
HALF-CONE WHITE ENAMELLED TIN SHADES.

For 2¼ and 3¼ inch holders.

8 inches, per dozen	\$1.75
10 " " "	2.25
12 " " "	3.25
14 " " "	3.75
16 " " "	5.00
18 " " "	6.00

TIN SHADES AND REFLECTORS (Continued).

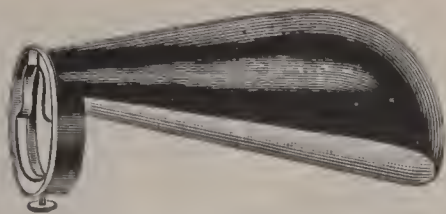


Figure 634.

TIN HALF REFLECTOR.

Green outside, White Enamel inside.

	Per doz.
For 2¼ inch holder, as per cut.	.\$4.50
We also make them with wire collar instead of tin.	
Price, per dozen	.\$3.00



Figure 635.

FULL-CONE WHITE ENAMELED TIN SHADES.

For 2¼ inch holders.

Diameter.	Per doz.
8 inches.	.\$3.25
10 "	3.75
12 "	4.50

FLUTED STEEL PORCELAIN ENAMEL SHADE.



Figure 636.

The growing demand for Steel Porcelain Enameled Reflectors for use on arc and gas lamps prompts us to offer to the trade this design of steel shade, in the belief that it will fill a long felt want.

This Reflector is 20 inches in diameter, with a 6-inch fitter, the latter specification conforming to the outer globes used on a large variety of arc lamps. It consists of but two pieces of steel, secured together without screws, rivets or seams, and constitutes the best and most durable enameled shade on the market.

The material is of good gauge steel, covered with porcelain enamel, both top and bottom, applied at a temperature of about 1800 degrees F. The design of this shade is peculiarly adapted to the process of enameling in that it prevents distortion and warping.

The corrugations furthermore strengthen the shade and result in better diffusion of light than can be obtained from plane surfaces.

BATTERIES.



Figure 637.

Carbon Cylinder, Open Circuit Battery.

Is reliable and uniform in action. Its electro motive force is 1.5 volts. Internal resistance .7 of an ohm.

The Carbon Element in the Battery is indestructible and is moulded in one piece, which make a perfect seal and prevents the climbing of the salts.

Complete Cell, with Sal. Ammoniac, each	\$0.65
Cylinder only, with Bushing, each	.40
Zincs, each.	.10



Figure 638.

SAMSON BATTERY NO. 2.

Size, 4½x4½x8 inches. (New Style.)

PRICE LIST.

Complete Cell, new style.	\$1.60
Carbon Vase, "	.85
Cylindrical Zinc, "	.21
Glass Jar, "	.19
Rubber Cover, "	.11
Sal-Ammoniac Charge	.10
Rubber Ring to suspend carbon.	.08
Rubber Plugs (per set of three).	.09

BATTERIES (Continued).

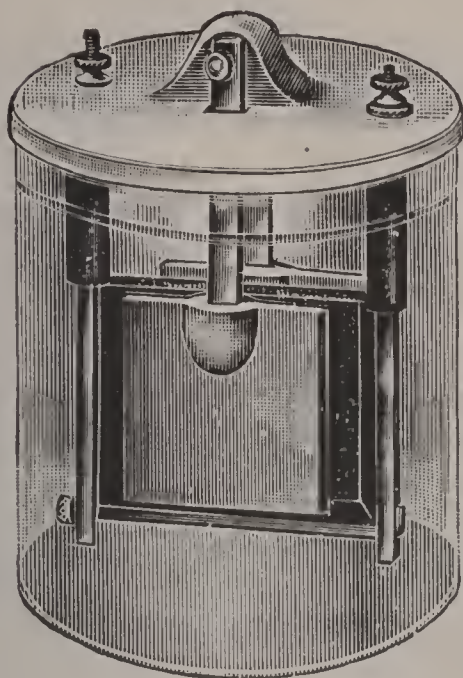


Figure 639.

Small Marine and Traction Gas Engine Model. Capacity, 100 Ampere Hours. Size 4½x6¾.

Price complete	\$2.20
Complete Renewal	.82
Copper Oxide Plate	.31
Zinc, "	.28
Can Caustic Soda	.17
Bottle Paraffine Oil	.06

DRY BATTERY.

A Thoroughly Dependable Battery.
Size, 2½x6.

Price each \$0.25



Figure 640.



Figure 641.

BATTERY ZINCS.

Battery Zincs, per M \$70.00

SAL AMMONIAC.

Sal Ammoniac, per lb. 15

WATCHMAN'S TIME DETECTOR.

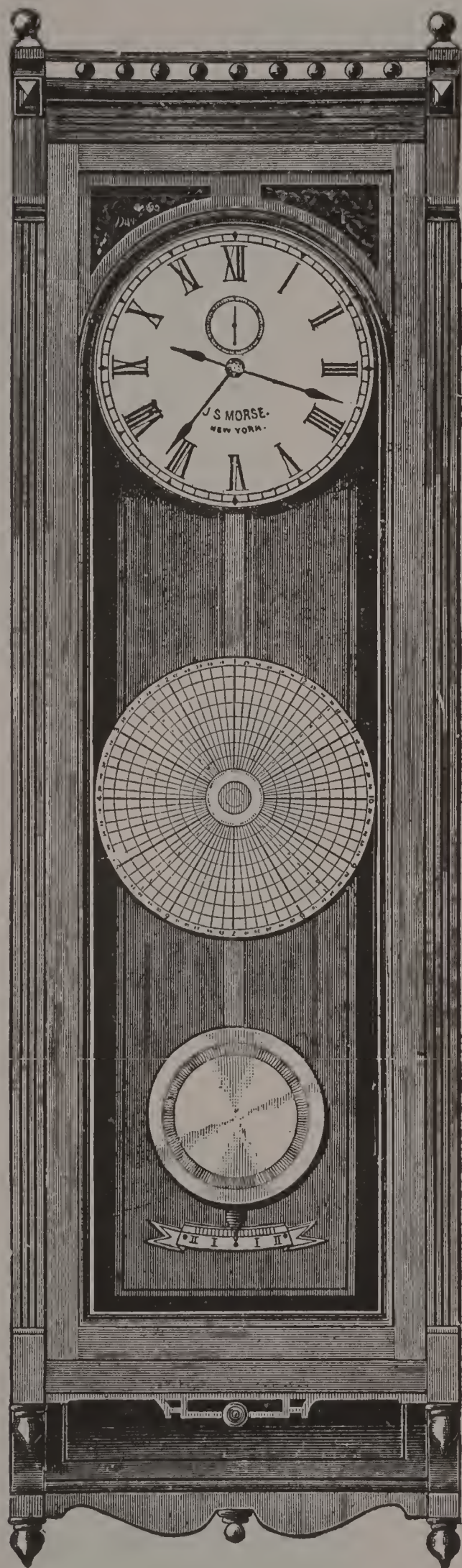


Figure 642.
Office Regulator.

Designed to keep an exact record of the doings of the night watchman in any establishment where it is in use. The instrument, closed with a security lock, is placed in the office and connected by insulated wires to stations placed in different parts of the premises where the watchmen are required to pass. As the watchman passes on his rounds he operates each station in turn, and this is instantly recorded in the Detector in the office, showing where each watchman is, and when he is at each station.

The record is made on a paper dial, twelve inches in diameter (shown in cut), which revolves on time by a clock movement. The record is made by needles, each punching a hole through the paper dial; each needle is operated from its own station. If the station is visited a record is made; if not, no record is made.

The effect of a watchman's having to record his movements by a system that cannot be evaded is to keep a constant guard of the property and protect it from loss. If a watchman is compelled to do his duty, there is almost no possibility of a fire getting a start, and this is the *ounce of prevention*, worth many pounds of cure.

Any delinquency on the part of the watchman is inevitably shown, and the proprietor is not dependent upon the testimony of watchman or porter, office boy or fireman to know whether good service is returned for money paid out to watchmen. Good watchmen prefer having this clock, as it aids them in doing their work and they can thereby prove their faithfulness.

Ten Station Recorder without	
Generators	\$75.00
Each additional Station.....	2.50
Each Station less, deduct.....	2.50
For each Station capacity add for	
Generator.....	5.00
For No. 1 Office Regulator, add..	50.00

ANNUNCIATORS.



Figure 643.
35 Numbers.

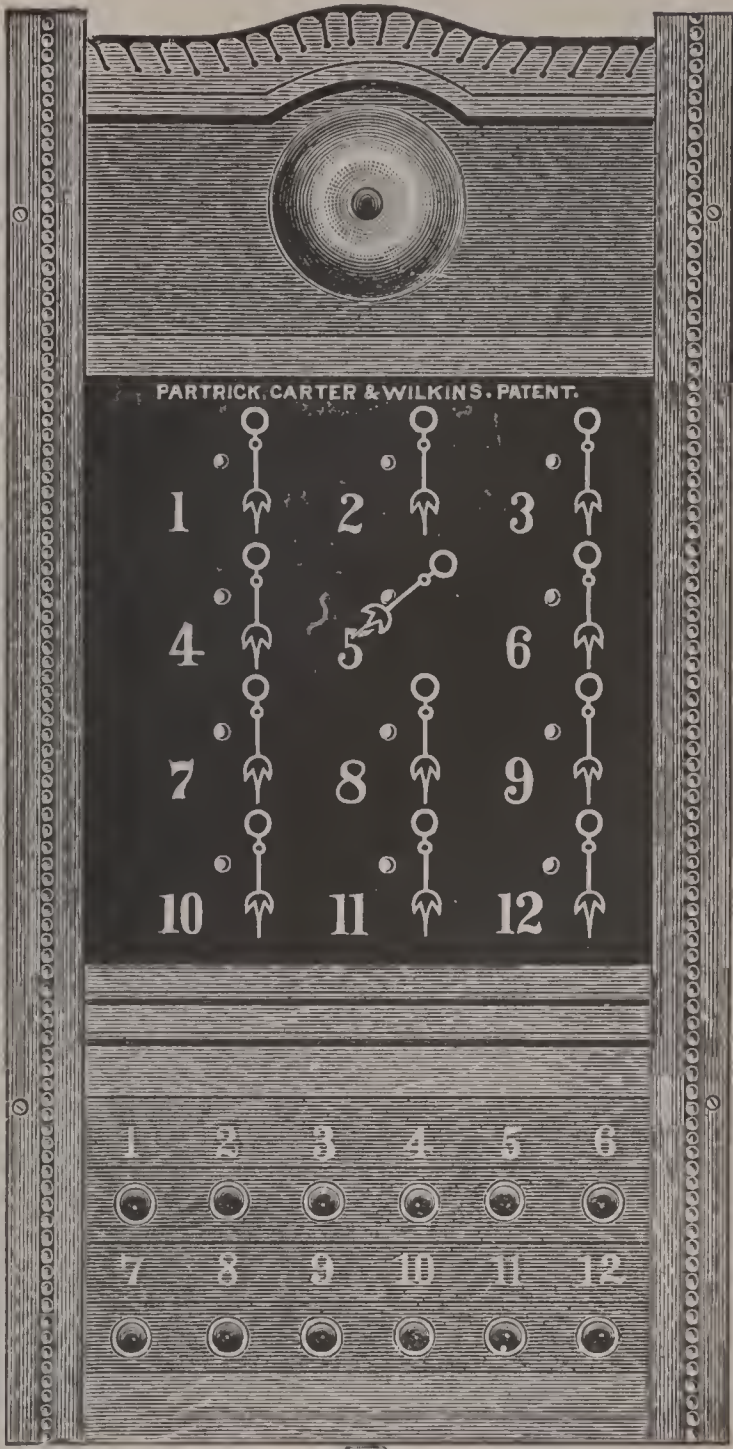


Figure 644.
12 Numbers, with Return Call.

PRICES.

		Without Return Call.	With Return Call	With Telephone Attachment.
6	Numbers	\$10 00	\$16 00	\$18 50
8	"	11 88	18 50	21 00
10	"	13 25	20 50	23 00
12	"	15 00	23 75	26 25
15	"	18 25	30 00	32 50
18	"	21 50	33 75	36 25
20	"	25 00	37 50	40 00
25	"	28 75	45 00	47 50
30	"	35 00	53 75	56 25
35	"	40 00	60 00	62 50

Intercommunicating Plugs, per set, \$4.50.
20 to 35 Numbers make a first-class cheap *form* Annunciator for small hotels.
Larger and finer Annunciators quoted special.

BELLS.

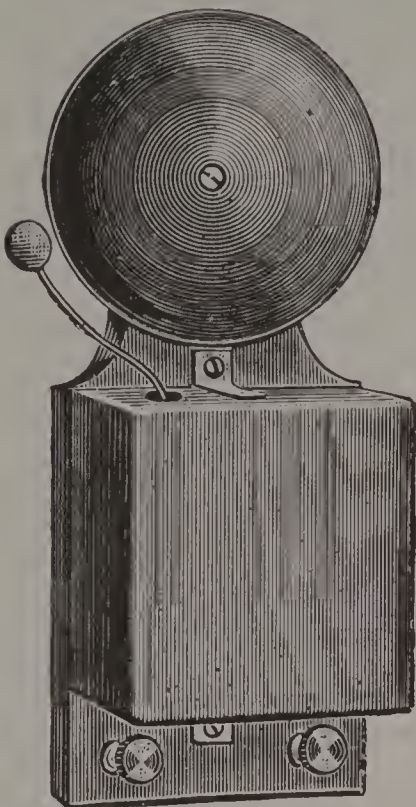


Figure 645.

WOOD BOX
BELL.
PRICES.

2½ inches .	\$0 76
3 " .	78
4 " .	1 00

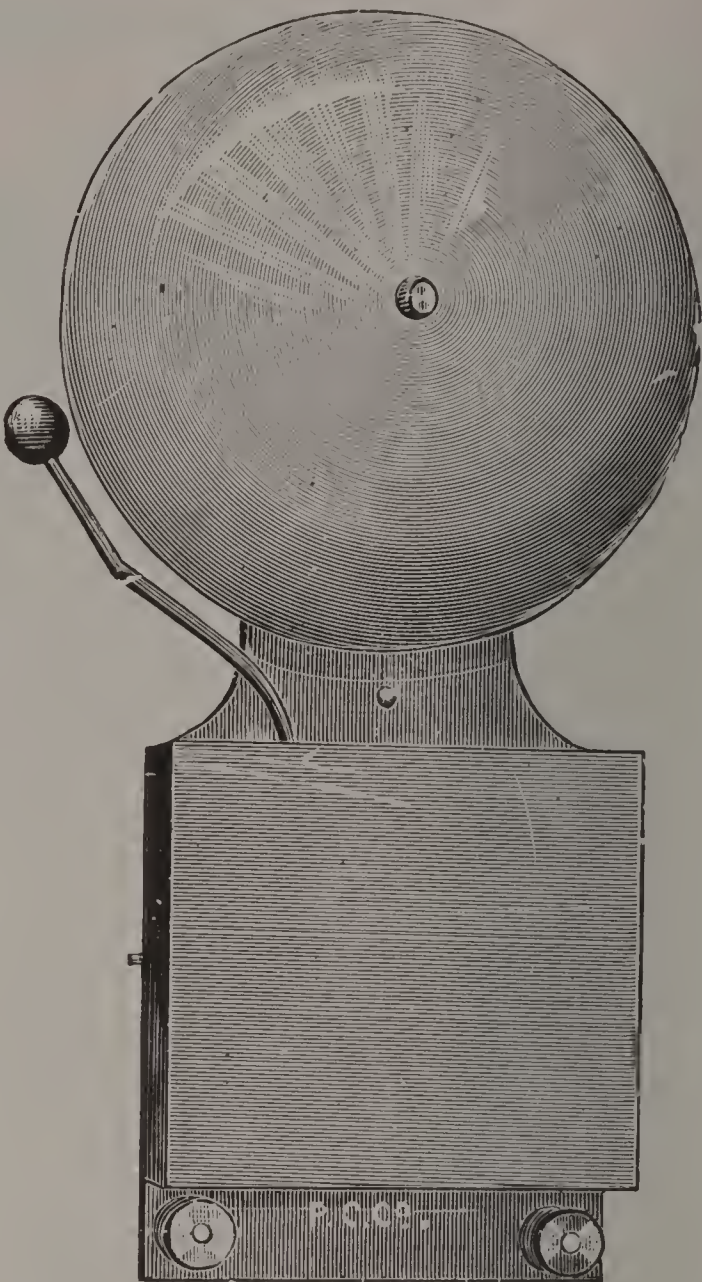


Figure 646.

LARGE WOOD BOX BELLS.
OAK.
PRICES.

5-inch	\$3 00
6-inch	3 40

WOOD BOX BELLS, WITH SPECIAL TONE GONGS.

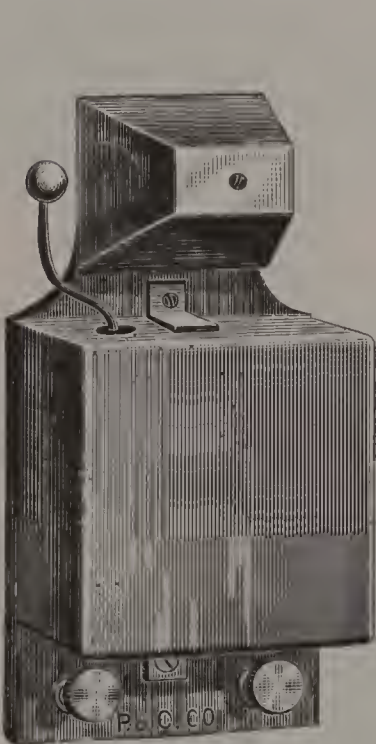


Figure 647.
Cow Bell.

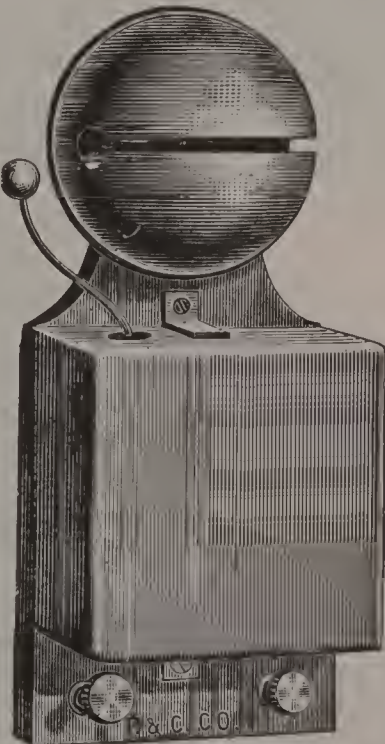


Figure 648.
Sleigh Bell.

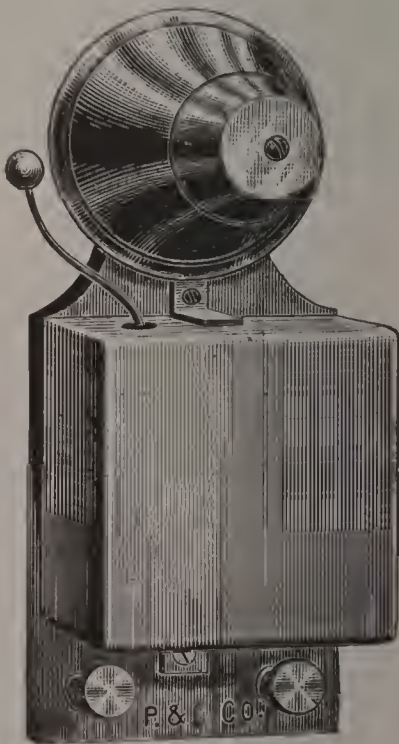


Figure 649.
Dinner Bell.

Sleigh Bell	\$1 00	Dinner Bell, 4-inch	\$2 00
Cow Bell	1 00	" 5 "	4 50
Dinner Bell, 2½-inch	1 00	" 6 "	5 00

BELLS. (Continued).

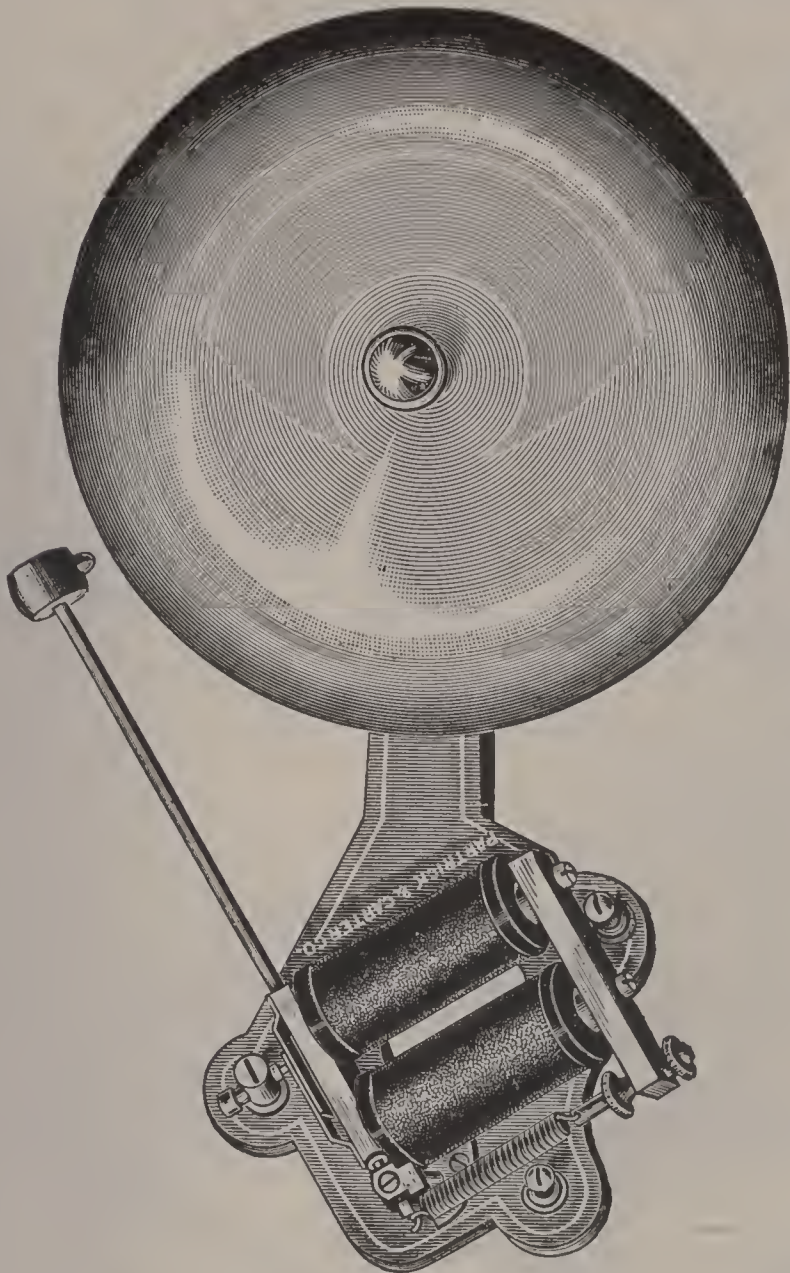


Figure 650.

THE GIANT SKELETON BELL.
PRICES.

8-inch		\$ 6 50
10 "		9 50
12 "		12 00

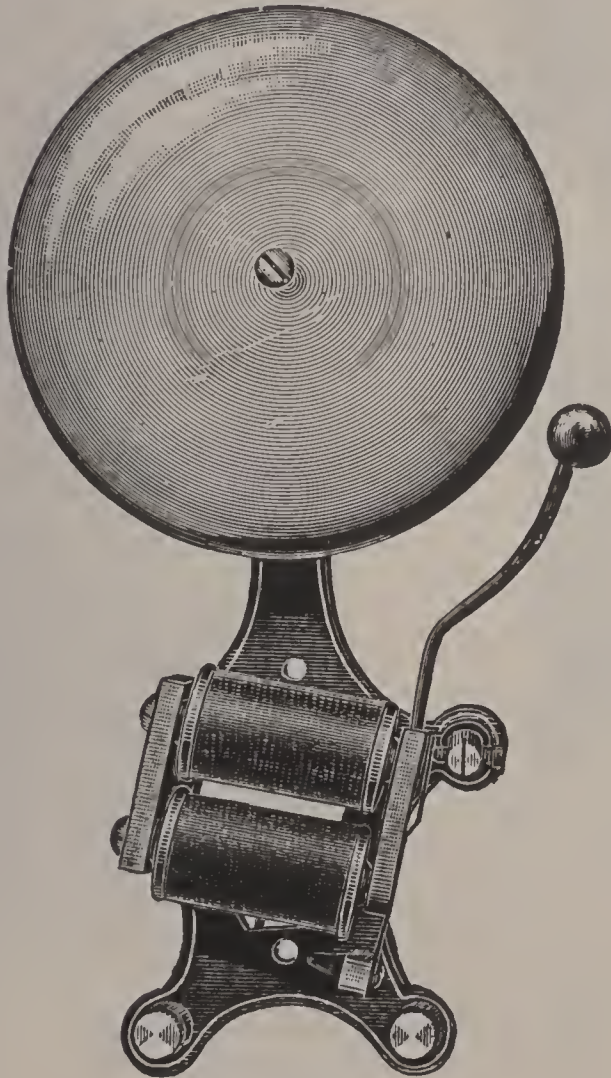


Figure 651.

THE CHAMPION SKELETON BELL.
PRICES.

5-inch		\$2 60
6-inch		3 00

BELLS (Continued).

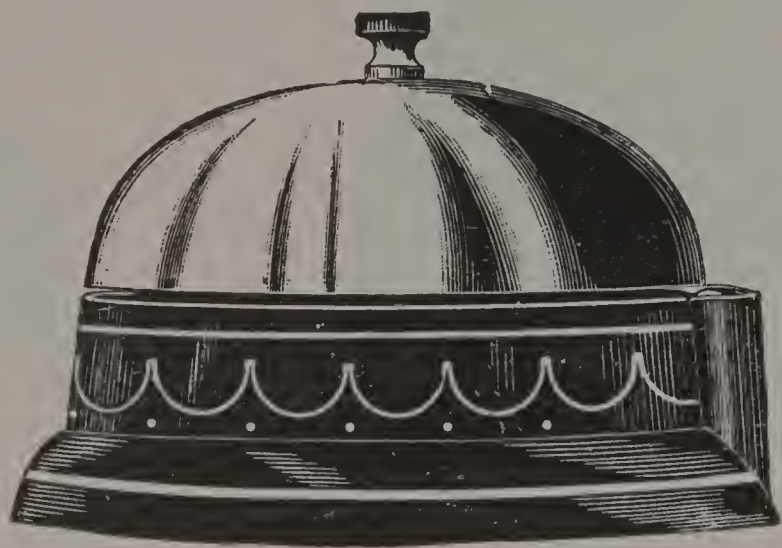


Figure 652.
Improved Form, Double Magnet Bell.
Cut Two-thirds Actual Size.
Made only in one size.

3-inch Gong.....	\$0.80
------------------	--------

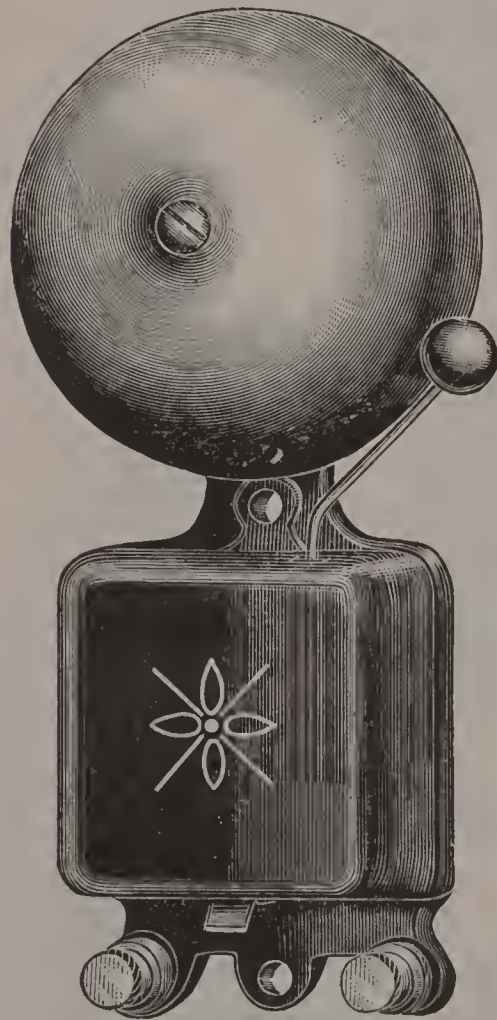


Figure 653.
Iron Box Bell.

PRICES.

2½-inch Gong	\$0 50
3 -inch Gong	52

BUZZERS.

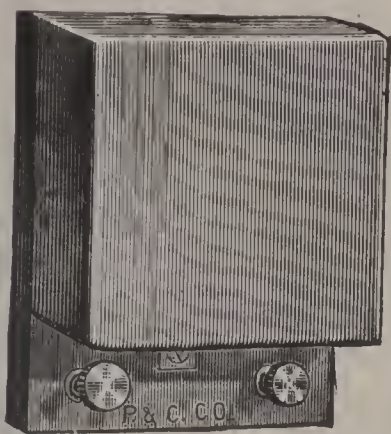


Figure 654.

Wood Box Buzzer.

Price \$0 72

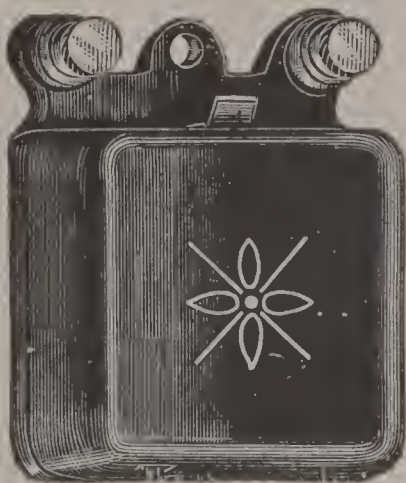


Figure 655.

Iron Box Buzzer.

Price \$0 48

POCKET BUZZERS.

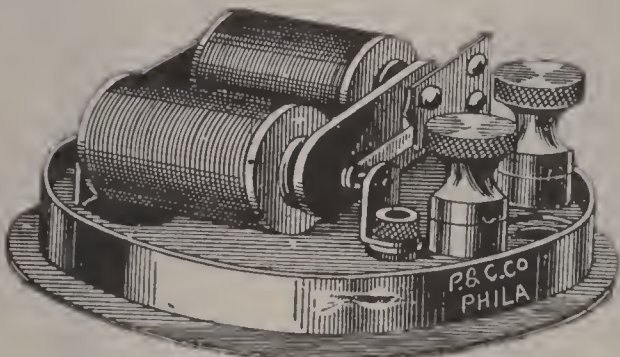


Figure 656.

Cover Off.

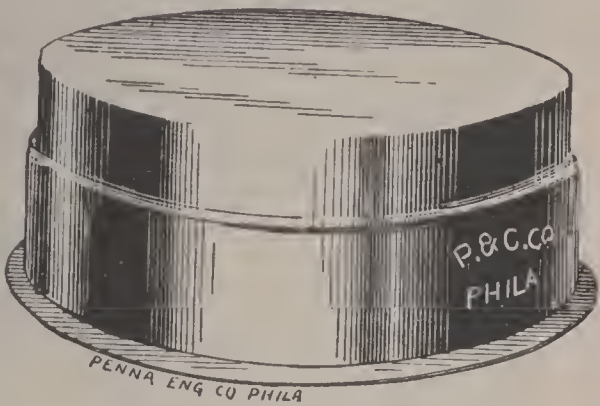


Figure 657.

Cover On. Cut Full Size.

Made entirely of metal and nickel-plated; gives a clear, loud and pleasant sound; will answer in many places where large Buzzers are used. A handy and indispensable Circuit Tester. Every electric bell fitter and wireman should have one. Price, 60 cents.

AUTOMATIC DROP.

OR CONSTANT RINGING ATTACHMENT FOR BURGLAR ALARMS AND BELLS.

This apparatus is used for closing a bell circuit automatically, and keeping it closed as long as desired. Placed in a bell circuit, when the circuit is closed by a push button or a drop or window spring, the Circuit Closer Drop, operated by an electro-magnet, falls and keeps the circuit closed until it is raised again. Also used in circuit with Magneto Bells to ring outside bell to call attention to attendants who may be located in another room.

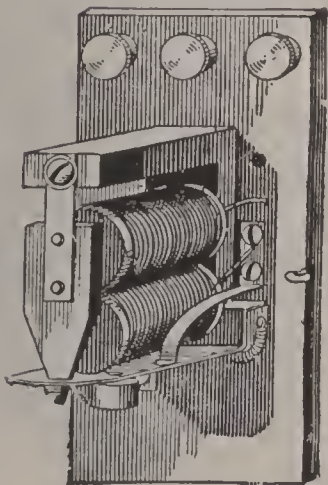


Figure 658.

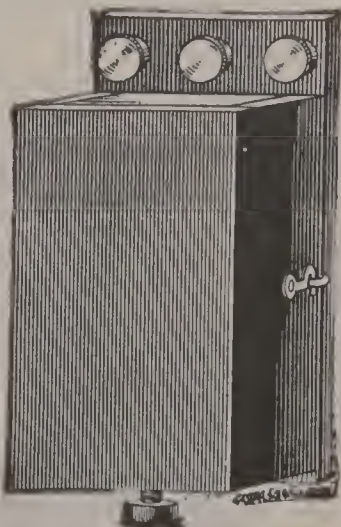


Figure 659.

Price in Oak Case for Battery Circuit	\$1 50
Price in Oak Case for Magneto Circuit	2 00

BRONZE STAMPED METAL PUSHES.
STRONG AND NEAT IN APPEARANCE. HIGHLY FINISHED.



Figure 660.
Price, 50 cents.

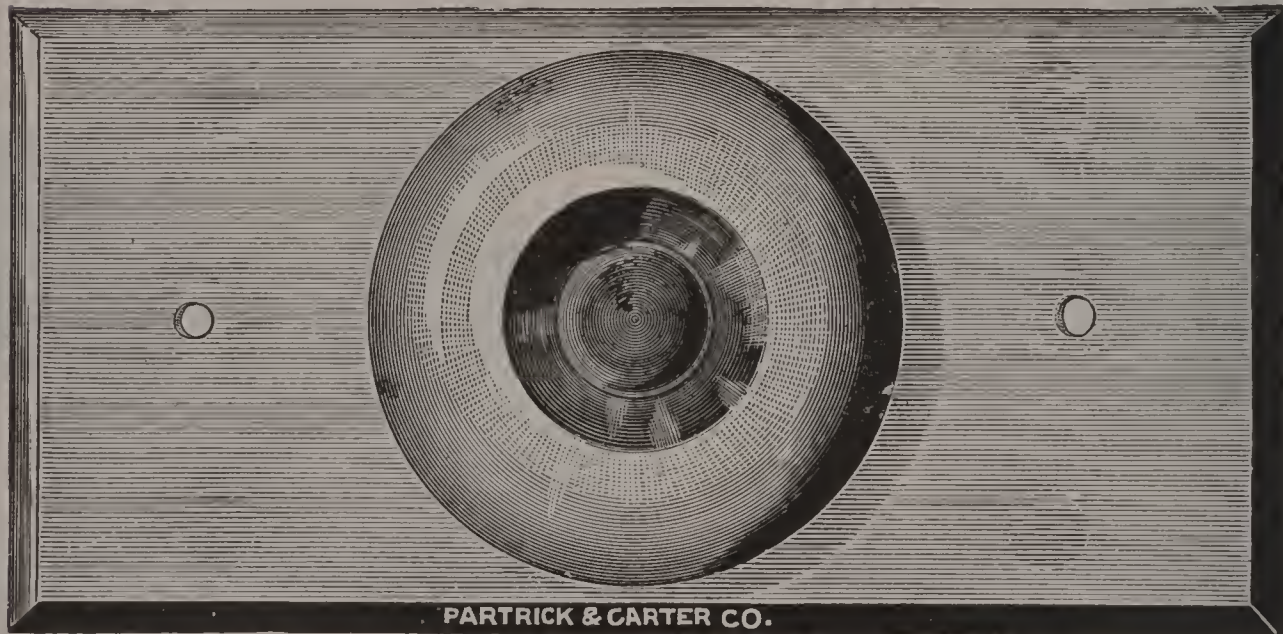


Figure 661.
Price, 50 cents.

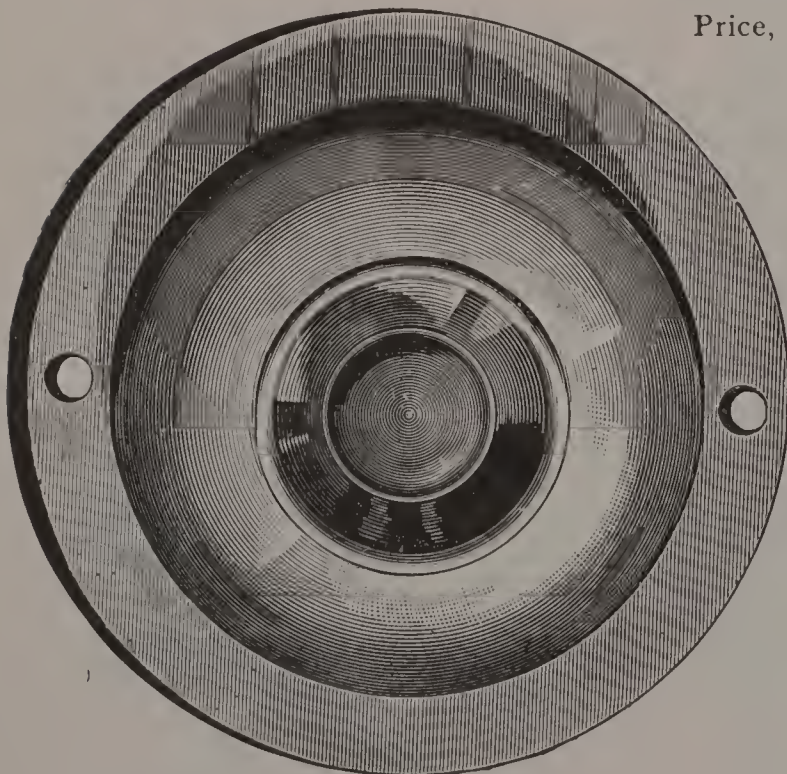


Figure 662.
Price, 24 cents.



Figure 663.
Price, 24 cents.

Cuts full size.
All Pushes on this page finished Bright Bronze or Antique Copper.

WOOD PUSH BUTTONS.

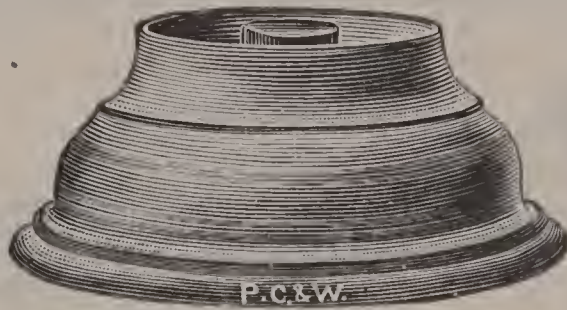


Figure 664.

Regular or Standard.

Base, $2\frac{1}{4}$ inches in diameter.

Cherry, Oak, Walnut, each 14c.

Mahogany, Rosewood, each 20c.

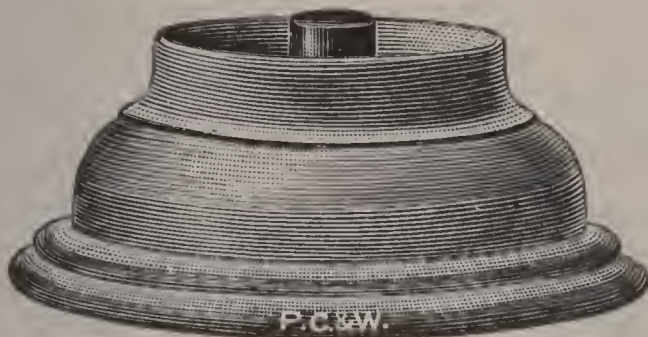


Figure 665.

Open and Closed Circuit Push, each 24c.

Oak and Walnut.

Base $2\frac{3}{8}$ inches in diameter.

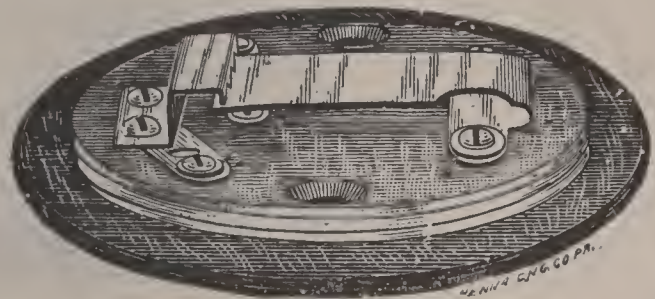


Figure 666.

- Inside of Open and Closed Circuit Push.

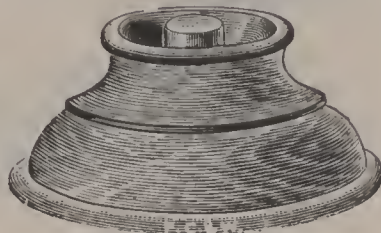


Figure 667.

Extra Small. Base $1\frac{3}{4}$ in. in Diameter.

Oak, Walnut, Cherry, Mahogany

Each 14c.



Figure 668.

Extra Large.

Base $3\frac{3}{4}$ inches in diameter. Used to cover up holes where Mechanical Pulls have been taken out.

Made in Oak and Walnut, each 24c.

These Pushes give the best of satisfaction wherever used; the contact is a pointed rubbing one; spring has easy, pleasant touch and responds quickly.

WOOD PUSH BUTTONS (Continued).

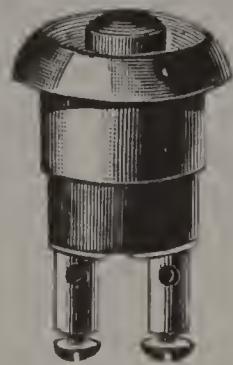


Figure 669.

CAR PUSH.

Nickel Finish Rubber Knob.
Price 20 cts.

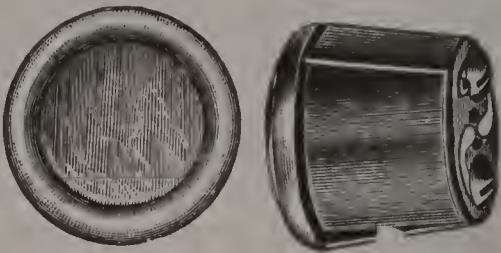


Figure 670.

PONY PUSH.

Pearl Button. Cut full size.
Nickel Plated, 20 cts.

TABLE CLAMP.

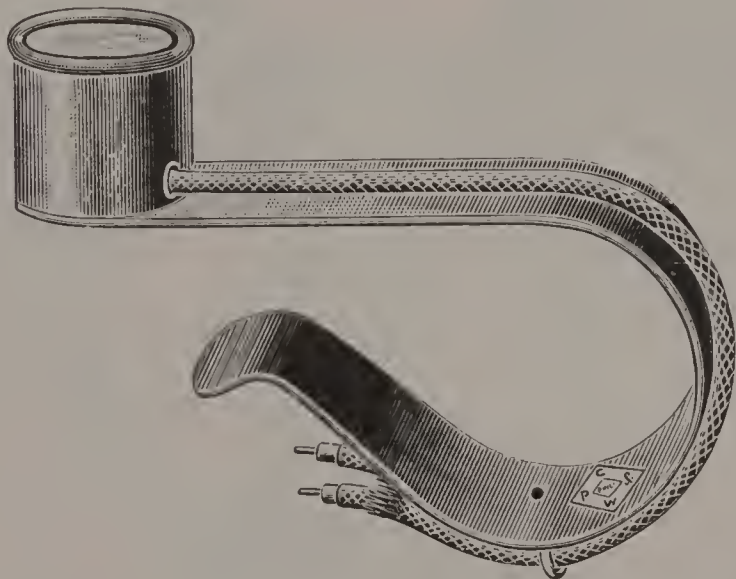


Figure 671.

For use with Dining Tables, Card Tables, Desks and other Movable Furniture.
Can be quickly put in position, and will not deface furniture. Can be used on top or underneath table.

Clamp, with Push \$0 60

COMBINATION FOOT PUSH.

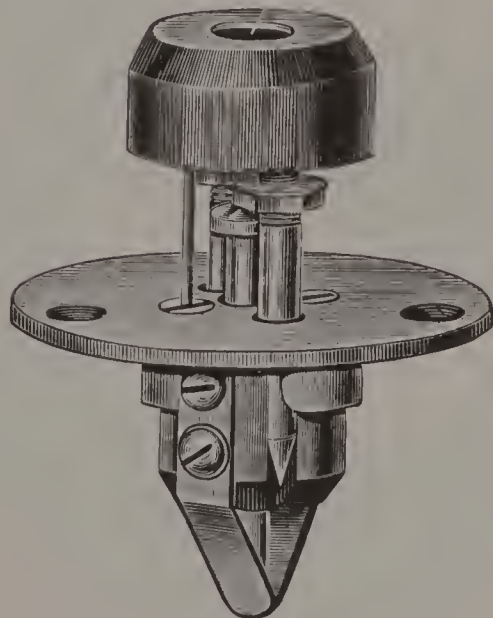


Figure 672,

The advantages of this Push are that the Foot-Push can be used with or without extension attachment. The holes are made through so no dust or dirt can possibly clog them up.

Price, Nickel-Plated \$0 60

COMBINATION FOOT-PUSH (Continued).

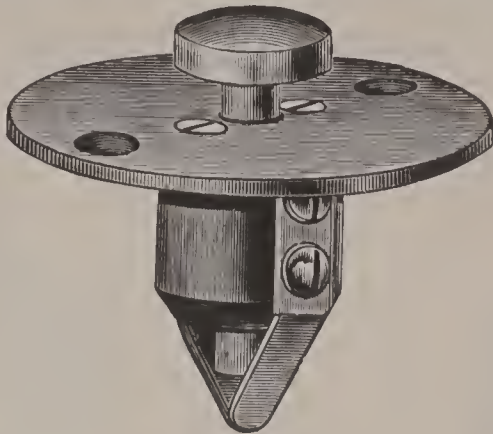


Figure 673.

PLAIN FOOT-PUSH.

(Same as Combination without Plug.)

Pin is Loose and can be Removed.

Price, Nickel-Plated \$0 44

PEAR-SHAPED PUSH BUTTONS.

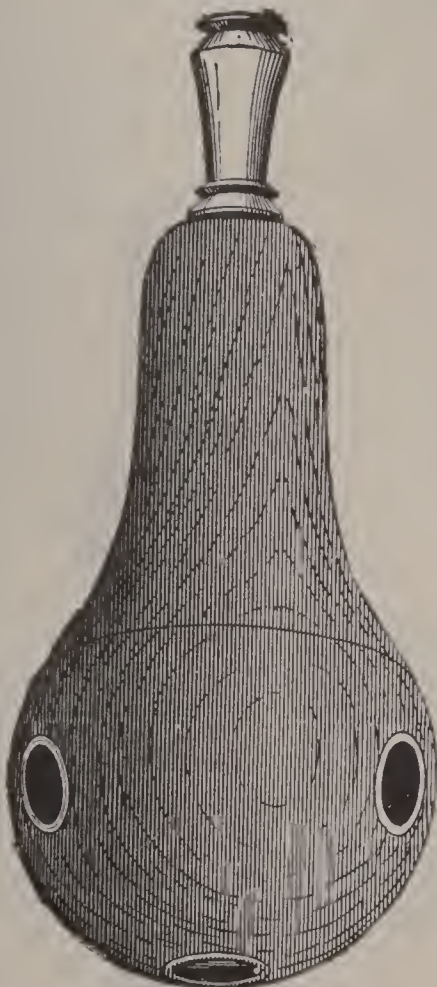


Figure 674.

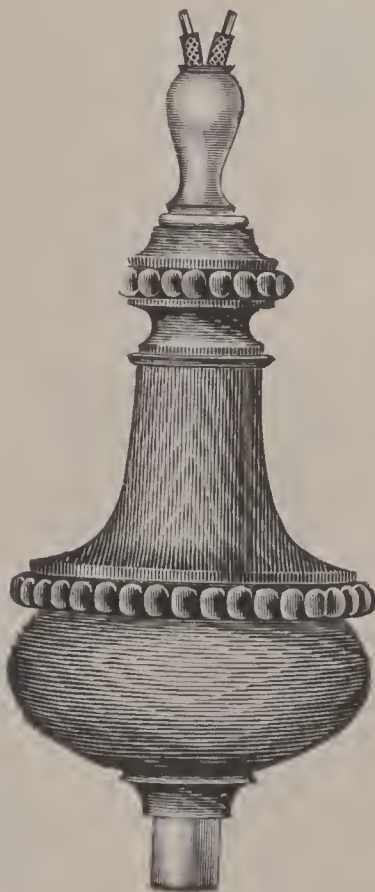


Figure 675.

ASSORTED WOODS.

These Push Buttons require but a very slight pressure of the finger to ring the bell. They are invaluable for the sick room, can be laid directly on the bed, or hung up when not in use.

Single \$0 44

PEAR-SHAPED PUSH BUTTONS (Continued).

COMPOUND PEAR PUSH.

2 Button	\$1 20	4 Button	\$1 80
3 Button	1 50	5 Button	2 50

Larger sizes made to order.



Figure 676.

Rosette.

For fastening to wall where connection
is made to flexible cord.
Price, each, 12 cents.

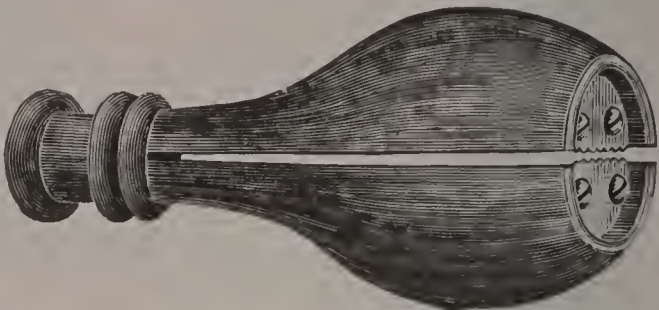


Figure 677.

Wood Presselle.
Price, each, 24 cents.

PEAR PUSH BUTTON CORD.

Two Conductors, per yard, Red or Green silk covered	\$0 20
Three Conductors, per yard, Green only	40
Four Conductors, per yard, Green only	70
Five Conductors, per yard, Green only	90
Six Conductors, per yard, Green only	1 00

DOOR AND WINDOW
SPRINGS.

OPEN CIRCUIT.

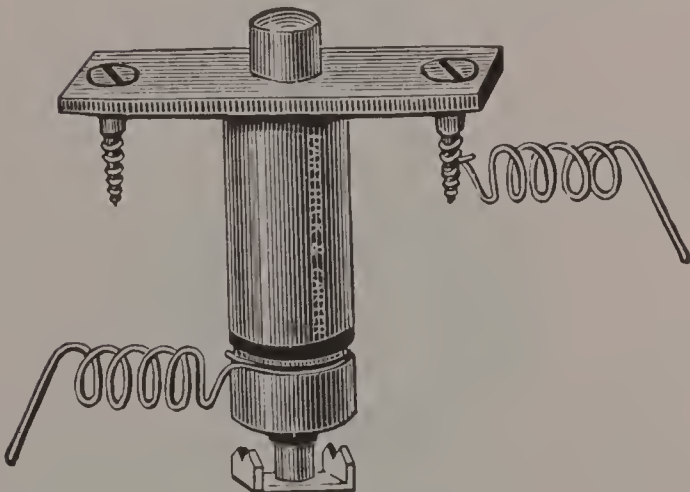


Figure 678.

Cut Full Size.

Round Door Spring.

Easy to put in. Takes up very little
room. Can be used for inside blinds as
well as doors. Price, 20 cents.

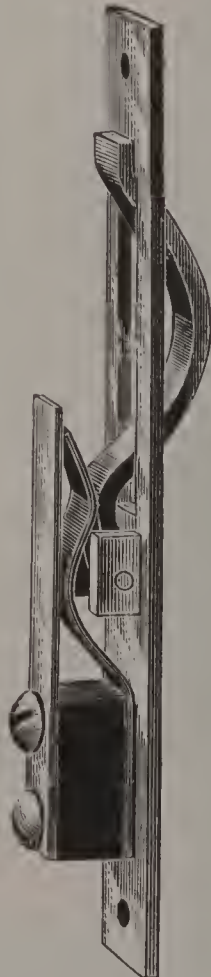


Figure 679.

Window Spring.

Substantial and reliable. Price, 20 cents.

DOOR AND WINDOW SPRINGS (Continued).

OPEN CIRCUIT.

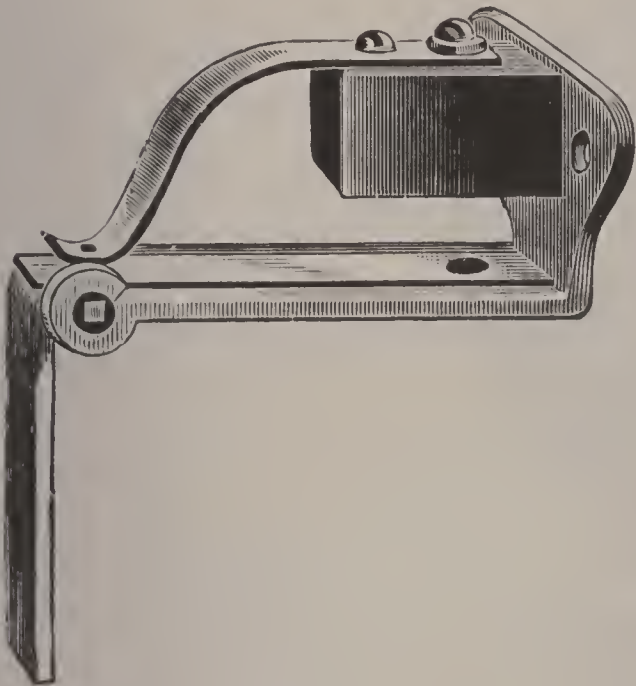


Figure 680.

Door Trip

For use on doors. Rings signal when door passes the trip, but is silent when open and in closing the door.

Price, 30 cents.

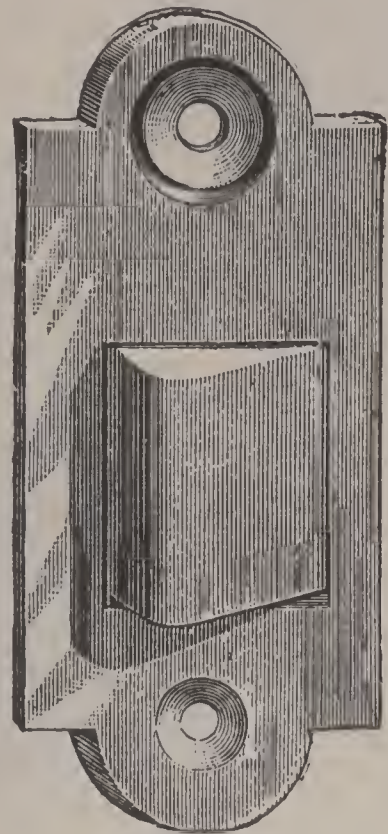


Figure 681.

Transom Spring.

For Pivot or Swing Windows. Price, 80 cents.

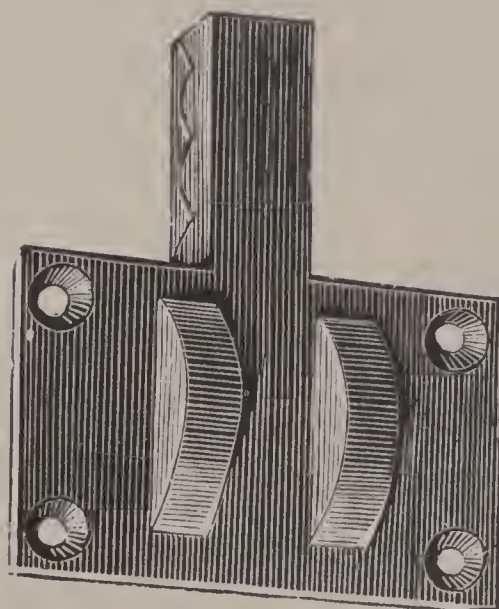


Figure 682.

Double Window Spring.
Strongest and Most Reliable.

Made from Casting.

Price, 80 cents.

Closed Circuit Springs furnished to order.

HOLLOW WOOD BASE SWITCH.

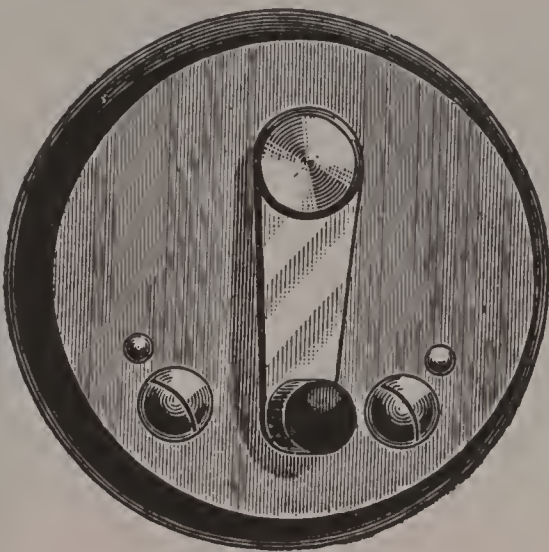


Figure 683.

A switch much more convenient than the old style. It has a hollow base, which permits of all wire connections being made underneath. Assorted woods. Metal parts nickel-plated.

1	Connecting Point, each		\$0 22
2	“ “ “		28
3	“ “ “		32
4	“ “ “		40

DOOR OPENERS.

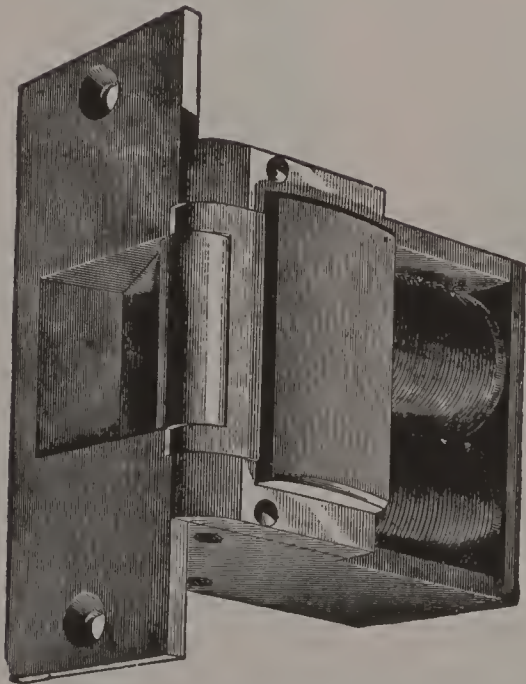


Figure 684.

MORTISE DOOR OPENER.

Entirely encased to protect it from dust and insects. The Patented anti-friction roller enables this Opener to be used for very heavy doors, with small battery power.

Each Opener is tested under heavy pressure and is warranted. Width of nosing, 1¼ inches.

Price \$6.00

GAS LIGHTING APPARATUS.

BATTERY CUT-OUT.

We respectfully call attention to a reliable Battery Cut-Out low enough in price to be a paying investment for owners of even small battery plants.

This Battery Cut-out has the following advantages, viz.:

Owners of gas lighting batteries will often save its cost at only one cross, as they can easily find and remove a caught burner or chain, and restore it themselves without calling in an expert, to say nothing of saving renewals to their batteries; and a battery is never so good as before, if it has been short-circuited a while, even after renewal by an expert.

Its use is not limited to gas lighting batteries.

It will always disconnect and save the battery if the wires become crossed.

The Cut-out has been thoroughly tested and is giving complete satisfaction.

The cover is a metal front. It can be easily removed by a slight twisting motion. The cover protects the works from dust and injury.

Price \$6.00.

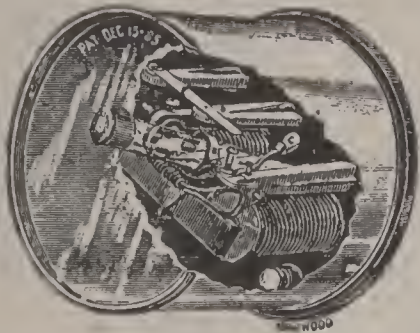


Figure 685.

GAS LIGHTING SPARK COILS.

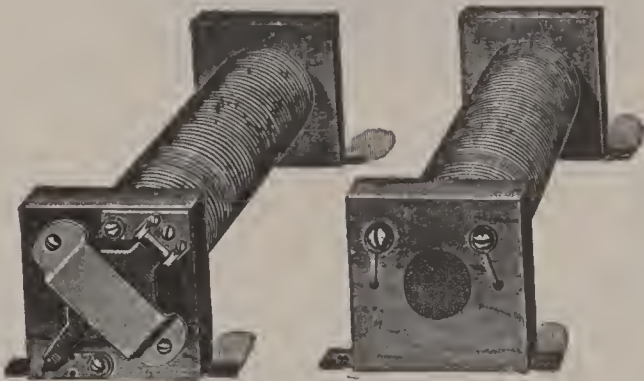


Figure 686.

PRICE.

8-inch . . .	\$2 75	10-inch . . .	\$3 90	12-inch . . .	\$4 50
--------------	--------	---------------	--------	---------------	--------

Wound 6 convolutions. No. 14 pure copper wire. Covered with imitation morocco; polished binding posts. Ebonized heads filled so that core wires are not exposed. A first-class Spark Coil in every respect.

GAS LIGHTING APPARATUS (Continued).

GAS LIGHTING BURNERS.

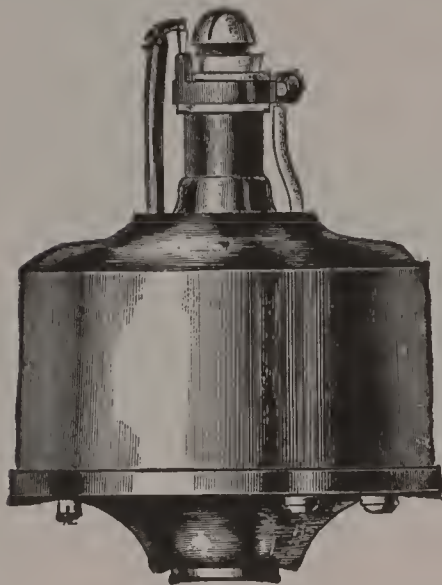


Figure 687.

Boston Automatic.
Price, each . . . \$6 00

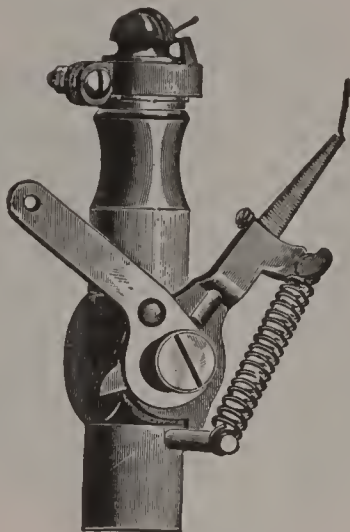


Figure 688.

Improved No. 10.
With 6-in. pull, each, \$1.00



Figure 689.

Incandescent Gas Lighting
For Welsbach . \$2 00



Figure 690.

Wood Base, Walnut, Ash,
Cherry and Oak.

2-Button key for 1 auto- matic.....	\$0.50
4-Button key for 2 auto- matic	.75
6-Button key for 3 auto- matic	1.10
8-Button key for 4 auto- matic.....	1.50
10-Button key for 5 auto- matic.....	2.00
12-Button key for 6 auto- matic.....	2.50



Figure 691.

Pearl Buttons. Nickel or
bronze plated.

2-Button key for 1 auto- matic	\$0.65
4-Button key for 2 auto- matic	1.00
6-Button key for 3 auto- matic	1 35
8-Button key for 4 auto- matic	1 80
10-Button key for 5 auto- matic.	2.15
12-Button key for 6 auto- matic	2.60



Figure 692.

Metal Key Mats.
Oak, Ash, Cherry, Mahogany
and Walnut Woods.

For 2-button key	\$0.20
" 4 " "	.25
" 5 " "	.30
" 8 " "	.35
" 10 " "	.40
" 12 " "	.45

BEAD CHAINS.		ACORNS, SOLID BRASS.	
Gilt, per yard	\$0.18	Gilt, per dozen.	\$0.36
Silver, "	.30	" " 100	3.00
Gold, "	.40	Cups and Pins, per dozen.	.40

SPEAKING TUBE SUPPLIES.

WHISTLES.

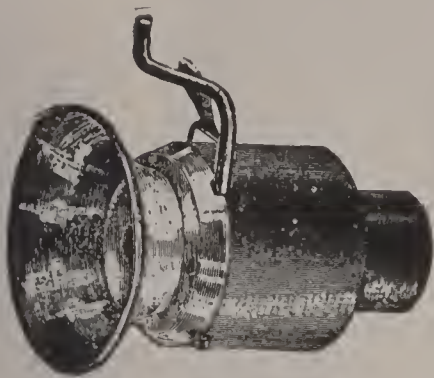


Figure 693.

ROUND METAL WHISTLE.

	List Price Per Doz.
With indicator nickeled	\$5 50
Without indicator nickeled	5 00
With blank shutter, for use with electric bell signals	5 00

BEVELED SPEAKING TUBE WHISTLE.

With indicator nickeled	\$ 7 00
Without indicator nickeled	6 50
With indicator, gold bronze	8 00
Without indicator, gold bronze	7 50
With indicator, cast dark or gold bronze	30 00
Without indicator, cast dark or gold bronze	30 00

These styles are made blank for electric work.

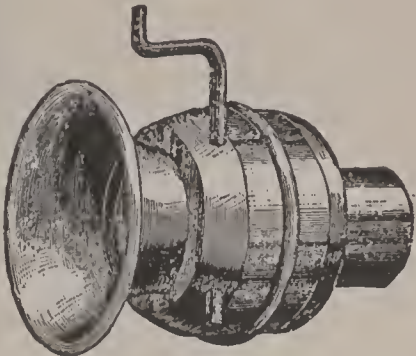


Figure 694.

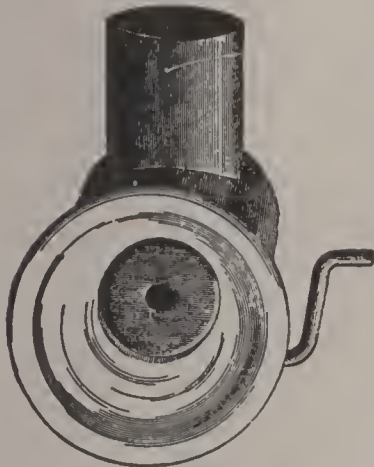


Figure 695.

ELBOW SPEAKING TUBE WHISTLE.

With Indicator, japanned body, porcelain mouth-piece	\$5 50
Without Indicator, japanned body, porcelain mouth-piece	5 00
With Indicator, nickel body, nickel mouth-piece	7 00
Without Indicator, nickel body, nickel mouth-piece	6 50

The Elbow Whistle is designed for speaking tubes that run outside of the walls and makes a combination of an elbow and a whistle, and brings the mouth-piece close to the wall.

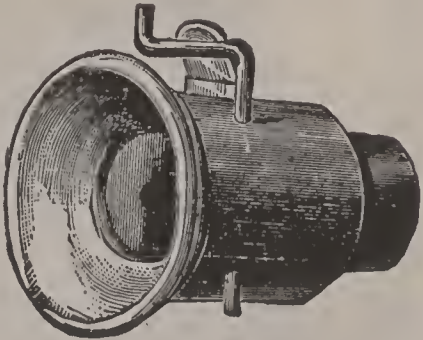


Figure 696.

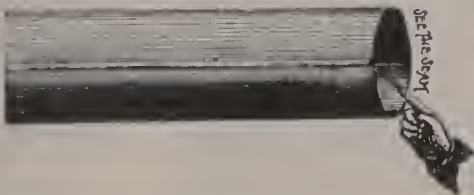


Figure 697.

Tin Tubing, 5-foot Lengths.

1 inch, per 1,000 feet	\$34 00
1 1/4 inch, per 1,000 feet	35 00

All Speaking Tube Supplies Carried in Stock.



Figure 698.

We are prepared to give advice on the availability of water powers, to estimate their capacity, engineer their development, and furnish estimates on cost of installing Water Power Plants.
Water Wheels, see page 76.
Electric Power Transmission, see page 379.

THE D. A. TOMPKINS CO.,

CHARLOTTE, N. C.

MISCELLANEOUS

MACHINERY

Mill Castings

Cement and

Asphalt Floors

USEFUL INFORMATION.

We make plans for Cotton Mills and contract for their
complete equipment, including power plant,
machinery, shafting, etc.

"TOMPKINS" SPINNING FRAME.



Figure 699.

Tompkins' Spinning Frame.
(Made in our shops.)
Prices quoted on application.

“TOMPKINS” SPOOLER.

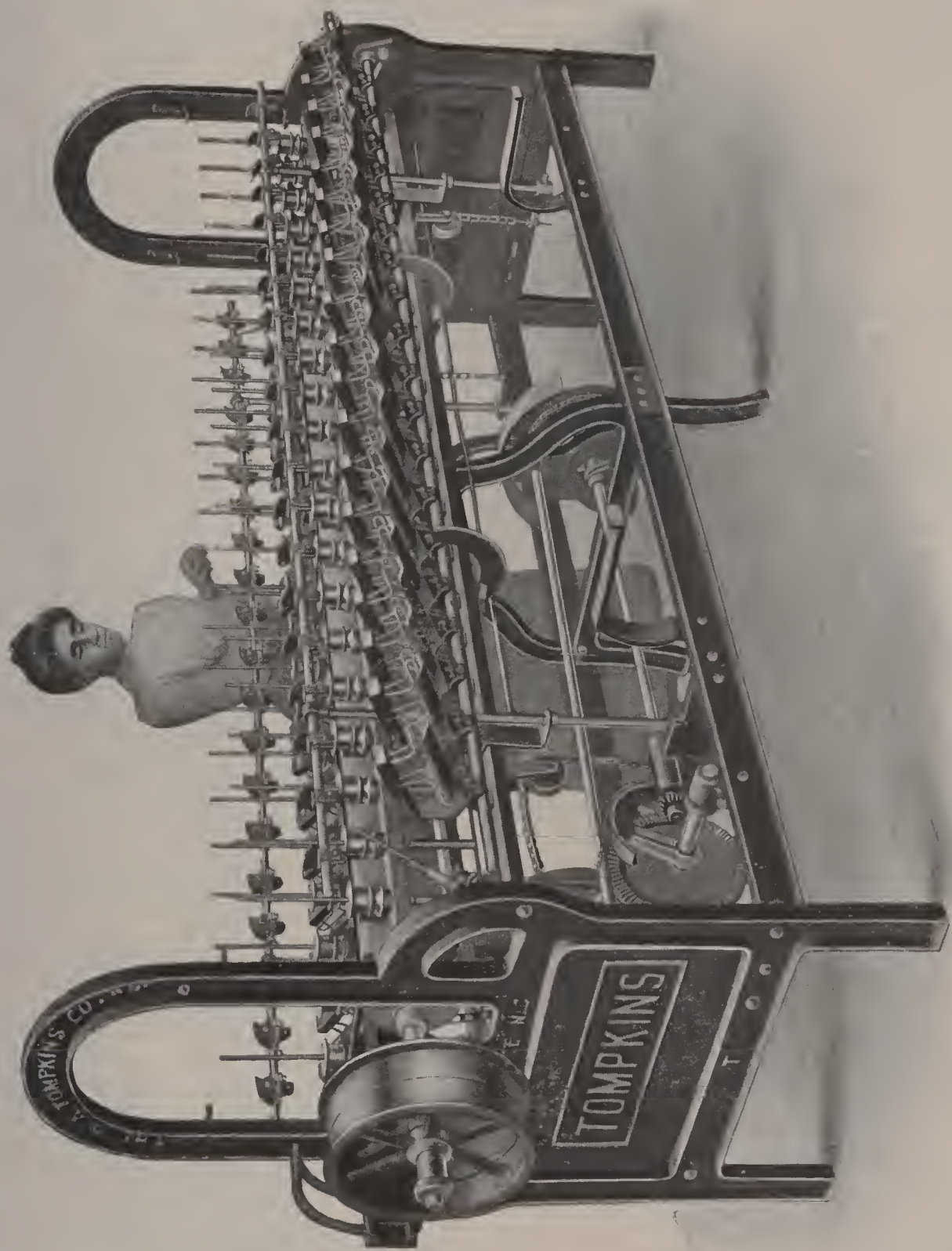


Figure 700
Tompkins' Spooler.
(Made in our shops.)
Prices on application.

“TOMPKINS” REEL.

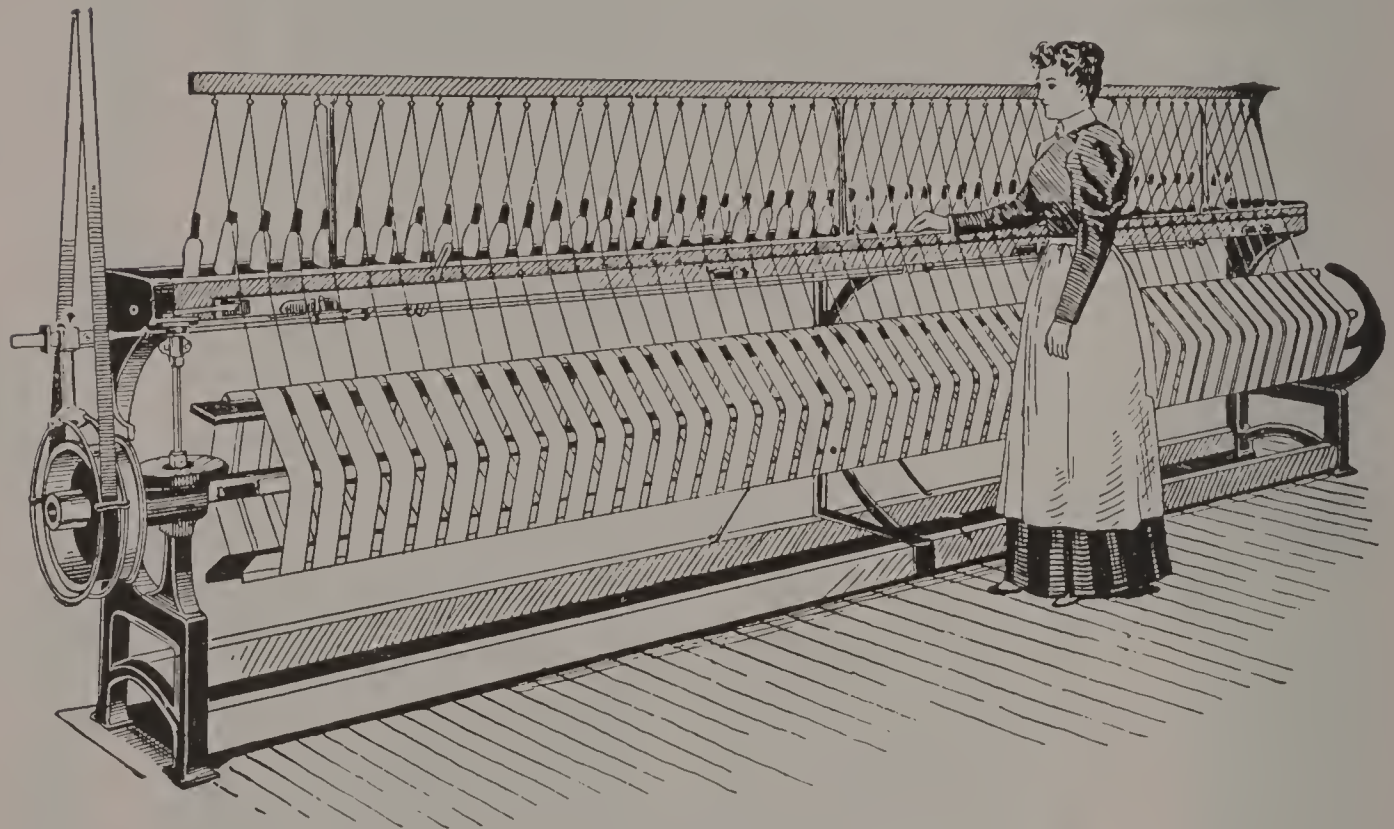


Figure 701.

Tompkins' Reel.

(Made in our shops.)

Prices quoted on application.

“TOMPKINS” BAND MACHINE.

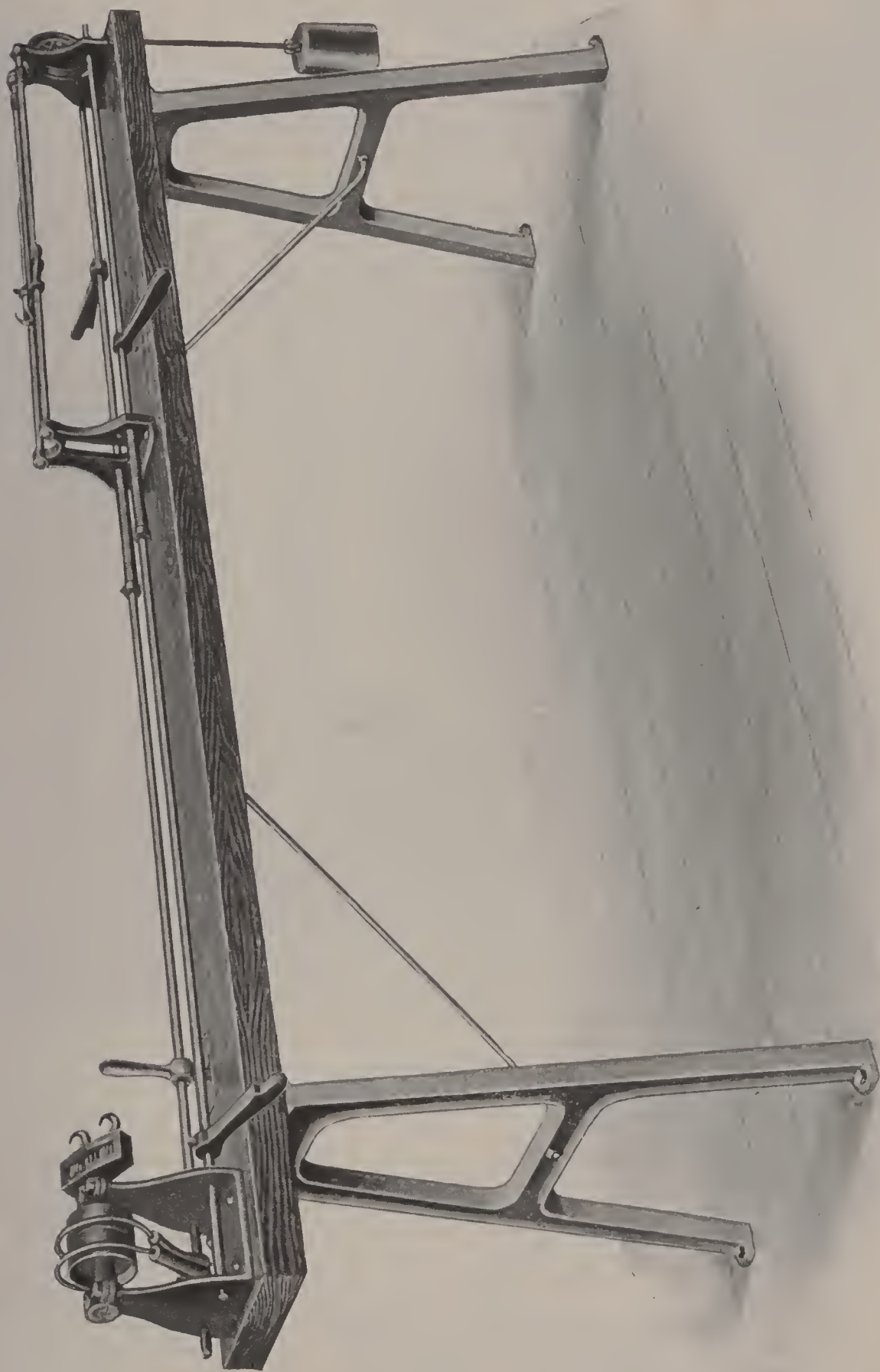


Figure 702.

Tompkins' Band Machine.
(Made in our shops.)
Prices quoted on application.

"TOMPKINS" DRAWING-IN FRAME.



Figure 703.

"Tompkins" Drawing-In Frame.
(Made in our shops.)
Prices quoted on application.

“TOMPKINS” IMPROVED SIZE KETTLE.

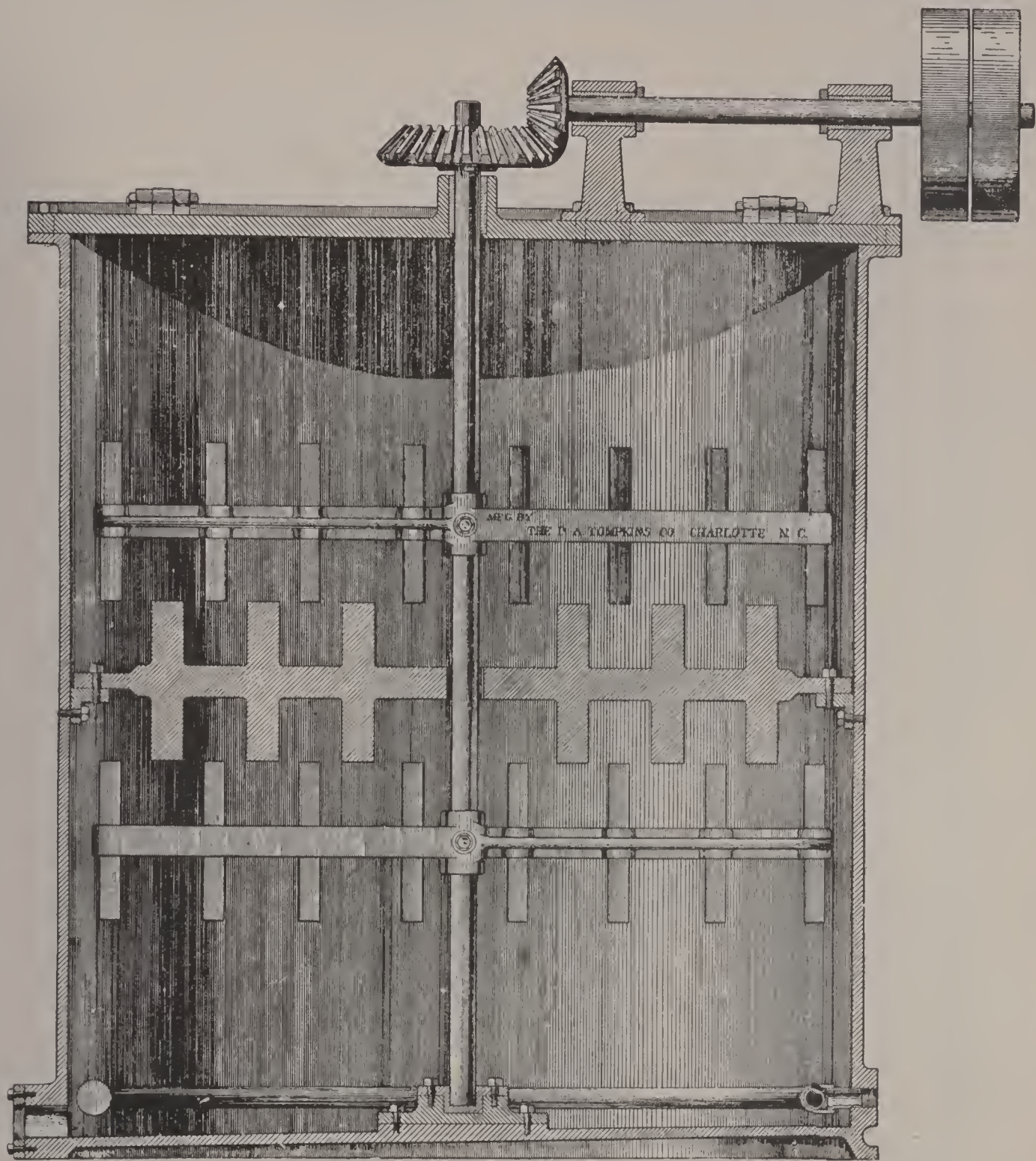


Figure 704.

(Made in our shops.)

The Size Kettle illustrated above was made to fill a demand for a starch mixer that will mix.

The center set of knives is made stationary, while the upper and lower set revolve with the shaft. This insures perfect agitation. By the old plan the whole volume of starch revolves with the stirrer *without mixing*. In the improved kettle the starch is thoroughly dissolved so that it can be incorporated in the yarn and not laid on the outside to be dusted off in passing through the loom. The yarn can be weighted with it if desired.

Internal diameter of kettle	37½ in.
Depth of kettle	40 in.
Cooking capacity	160 gals.
Pulleys	10 x 2
Speed of pulleys	50 to 60 rev.
Gears	2 to 1
Speed of blades	25 to 30 rev.
Weight	1,400 lbs.
Price	\$160.00

Other sizes to order,

NEW AND HEAVY WASTE PRESS.

(Made in our shops.)

Of the best heart pine. Extra heavy lumber.

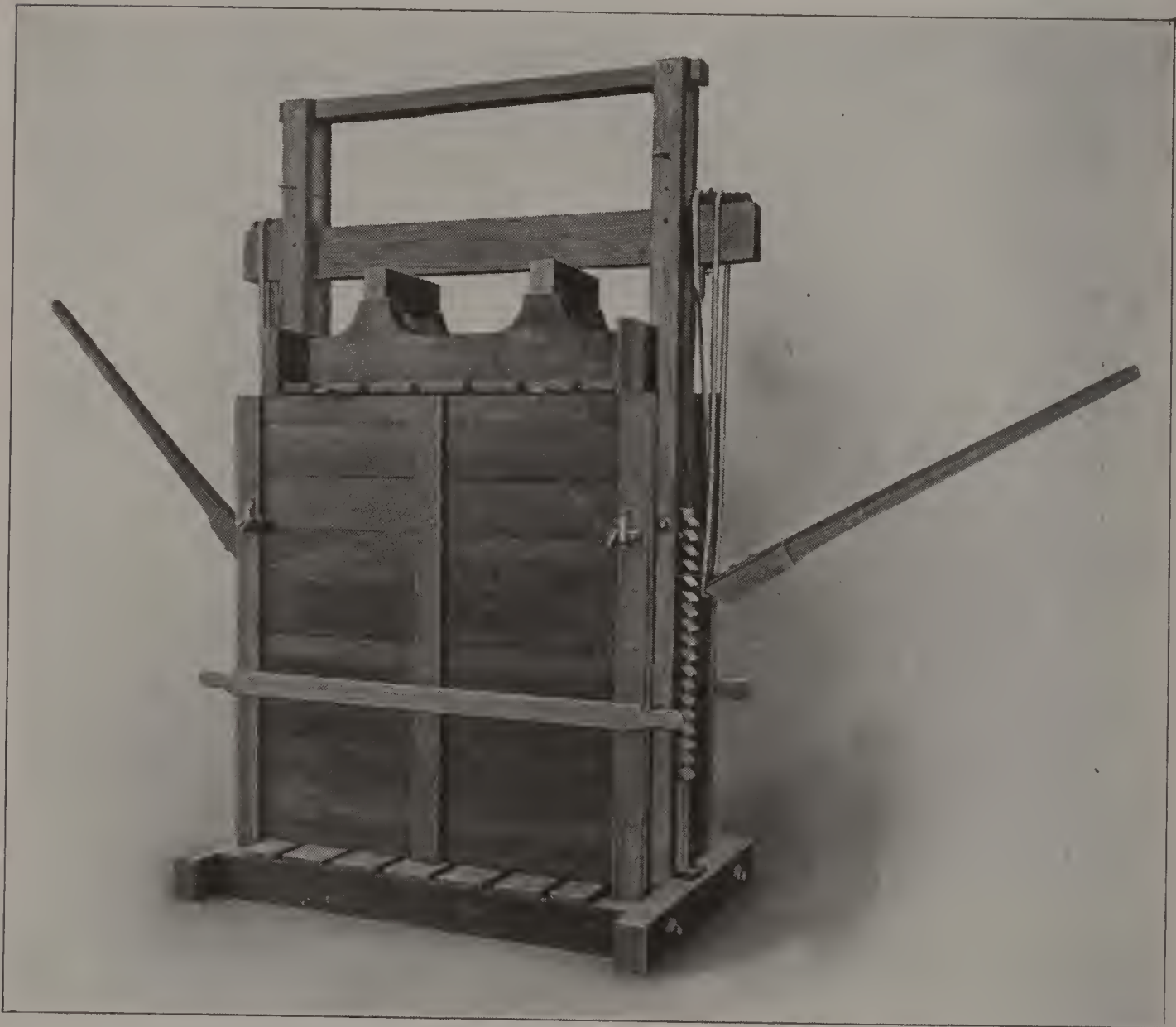


Figure 705.

TWO SIZES.

24 x 48, f. o. b. Charlotte	\$50 00
24 x 52, f. o. b. Charlotte	52 50

Other styles of baling presses are shown among Cotton Oil Mill Machinery.

MILL CASTINGS.

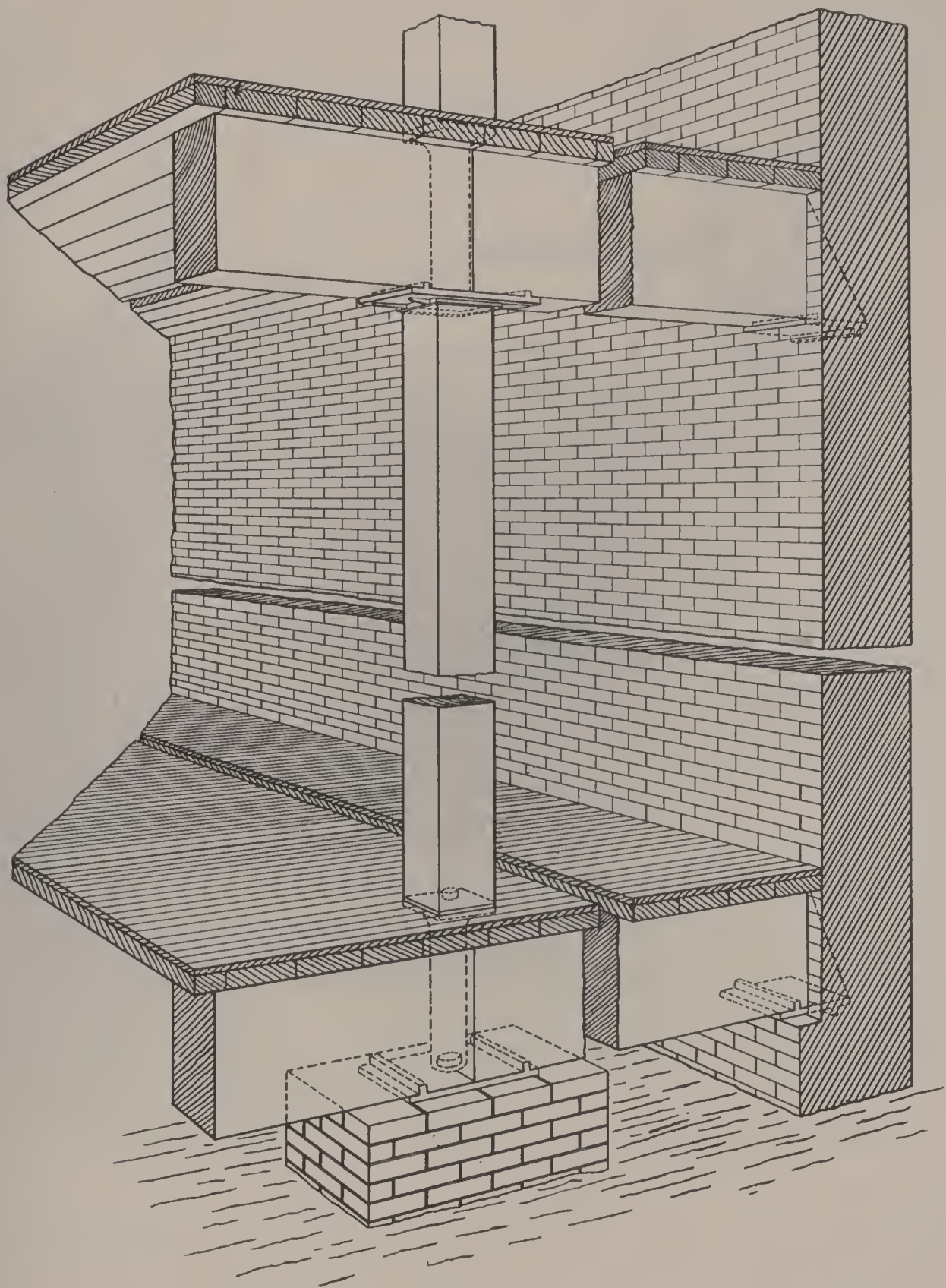


Figure 706.

We have a full line of patterns and are prepared to furnish from our foundry, castings for standard slow-burning mill construction as shown above.

We make also patterns and castings from drawings or sketches when desired.

We make a *specialty* of gear blanks and all other kinds of mill castings which are of superior quality. They are made from specially prepared mixture and have been widely used and universally approved.

RE-FILING STEEL ROLLS.

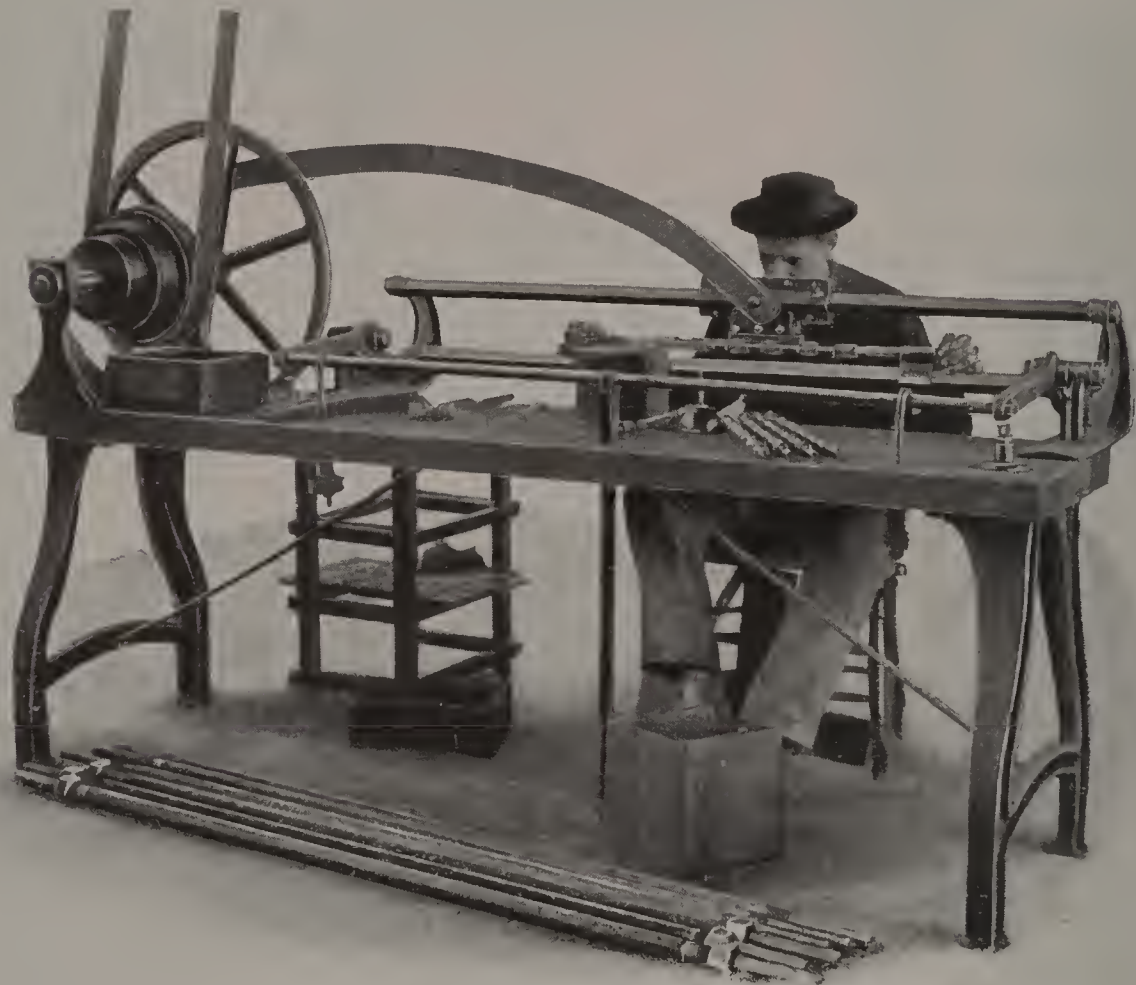


Figure 707.

Re-filing fluted steel rolls in our shop.

We will be glad to furnish prices on work of this nature.

SCALES.

We furnish Scales for all purposes.

Prices for Wagon, Track, and Portable Square Platform Scales may be found on pages 365, 366 and 367. Prices for other types on application.

CEMENT AND ASPHALT FLOORS.

We are prepared to contract to put down cement and asphalt floors in basements or other places. Prices on application.

No. 3 ROLLER GIN.



Figure 708.

No. 3 Roller Gin.
(Made in our shop.)
See pages 373 and 374.

CORNER STONES, TABLETS AND ADVERTISING PLATES.

(Bronze or Iron.)

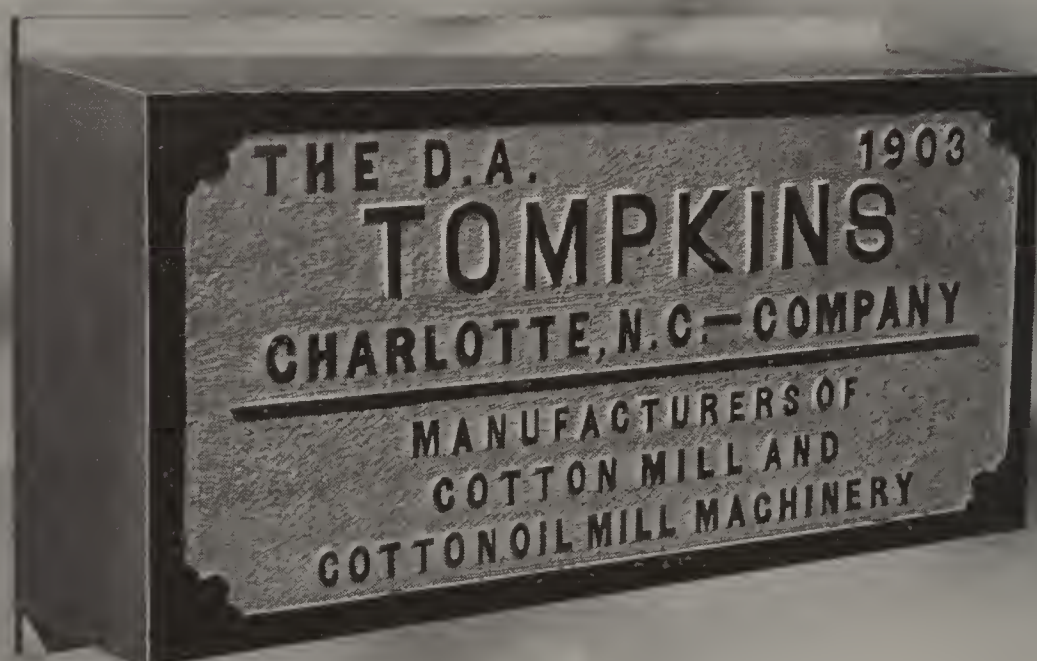


Figure 709.

Bronze Corner Stone.

We have found these useful in our advertising and until recently have been buying them and paying high prices. We are now equipped for making them and at very much lower prices. We will be pleased to figure on your requirements in this line and can furnish them in either bronze or iron, of any size and having any desired lettering, either in the shape of flat plates for advertising or memorial purposes or in box shape so that they can be used for corner stones.



USEFUL INFORMATION.



To find the capacity of a cylinder in gallons.—Multiplying the area in inches by the length of stroke in inches will give the total number of cubic inches; divide this amount by 231 (which is the cubical contents of a gallon in inches), and the product is the capacity in gallons.

To find quantity of water elevated in one minute running at 100 feet of piston speed per minute.—Square the diameter of water cylinder in inches, and multiply by 4. Example: Capacity of a five-inch cylinder is desired; the square of the diameter (5 inches) is 25, which, multiplied by 4, gives 100, giving gallons discharged per minute (approximately).

To find the diameter of a pump cylinder to move a given quantity of water per minute (100 feet of piston travel being the speed), divide the number of gallons by 4, then extract the square root, and the result will be the diameter in inches.

To find the pressure in pounds per square inch, due to forcing a given quantity of water through a certain size of pipe, (table of Friction of Water in pipes page 472). Add the amount of this friction to the pressure due to the height to which water is to be forced; the result is total water pressure.

The area of steam piston multiplied by the steam pressure gives the total amount of pressure exerted. The area of the water piston multiplied by the pressure of water per square inch gives the resistance. A margin must be made between the power and resistance to move the pistons at the required speed; usually estimated at from 25 to 50 per cent.

To find the pressure in pounds per square inch of a column of water, multiply the height of a column in feet by .431. Approximately every foot elevation is called equal to one-half pound pressure per square inch.

To find the velocity in feet per minute necessary to discharge a given volume of water in a given time, multiply the number of cubic feet of water by 144, and divide the product by the area of the pipe in inches.

To find the area of a required pipe, the volume and velocity of water being given, multiply the number of cubic feet of water by 144, and divide the product by the velocity in feet per minute. The area being found, it is easy to get the diameter of pipe necessary.

The mean pressure of the atmosphere is estimated at 14.7 pounds per square inch. With a perfect vacuum, at sea level, it will therefore sustain a column of mercury 29.9 inches, or a column of water 33.9 feet.

The friction of water in pipes increases with the square of its velocity. The capacity of pipes increases with the square of their diameter, thus doubling the diameter increases the capacity four times.

To find the horsepower required to elevate water to a given height, multiply the total weight of the water in pounds by the height in feet, and divide the product by 33,000. An allowance should be made of 25 per cent for water friction; also about 25 per cent for loss in steam pipe and cylinder.

Capacity of pipes: A pipe one yard long holds as many pounds of water as the square of its diameter, in inches. Thus a 6-inch pipe holds 36 pounds of water in each yard of length.

USEFUL INFORMATION (Continued).

The weight of coal equivalent in heat production to one ton of dry wood is figured to be 836 pounds.

Factor of safety for a laced belt is one-sixth its breaking weight for leather, and one-eighth for rubber.

An acid-proof cement that will withstand a high temperature might be made of litharge and glycerine.

The strongest explosive power of gasoline vapor is made by a mixture of one part vapor to eight parts air; of crude oil illuminating gas, one part gas to six parts of air.

A belt traveling 3500 feet per minute will require a tension of but $9\frac{1}{2}$ pounds for each inch in width in order to transmit 1 h. p., and one having a width of $100 \div 9.5 = 10.5$ inches, will transmit 100 h. p.

Common iron castings may be coppered by dipping the absolutely clean castings into a solution of $1\frac{1}{2}$ pound copper sulphate in water to which one ounce sulphuric acid has been added, the articles so coppered being subsequently washed and dried.

To find the length of a roll of belting (approximately): Take the sum of the diameter of the roll and the "eye" in inches, multiply this by the number of turns or laps made by the belt, and this product multiplied by the decimal .1309 will equal the length of the belt in feet.

The American standard boiler horse power as adopted is: Thirty pounds of water evaporated per hour at a boiler pressure of seventy pounds, the temperature of the feedwater being 100° Fahrenheit. For example, a boiler evaporates 300 pounds of water per hour, boiler pressure seventy pounds, feedwater 100° Fahrenheit, then the boiler would be $300 \div 30 = 10$ h. p.

A strip of single belting, 1 inch wide and 13 feet long, weighs, approximately, one pound, and a similar strip of double belting, 8 feet long, also weighs a pound; so that the weight of a belt may be estimated by multiplying the width in inches by length in feet, and dividing the product by 13 for single and 8 for double belts; the quotient will be the weight in pounds.

Another aluminum solder recently made public by the issue of patent privilege, is composed of aluminum, 5 parts; antimony, 5 parts, and zinc, 90 parts. The aluminum is first melted and then the zinc is added, after which the antimony. The alloy is thoroughly puddled with sal-ammoniac until the surface is clear and white. It is then poured into bar molds, making it ready for use.

Aluminum, because of possessing the property of forming under whetting action a very fine mass to which steel strongly adheres, is being used for manufacture of whetstones. A steel blade sharpened on aluminum, when examined by microscope at 1,000 diameters, shows the cutting edge perfectly uniform and unbroken—not serrated, as steel whetted on stone.

To find the length of belt needed when you have the diameters of the pulleys, and the distance between the centers of the shafts, multiply half the sum of pulley diameters by 3.2 and add twice the distance between the centers of the shafts. This result is usually near enough for practical purposes. If, however, the diameters are very different and the centers short the result will be too small. If the pulleys are exactly the same diameter multiply by 3.416 instead of 3.2.

TABLE OF AREAS OF CIRCLES.

Diameter.	Area.	Diameter.	Area.	Diameter.	Area.	Diameter.	Area.
$\frac{1}{8}$ in.	.012	$7\frac{3}{4}$ in.	47.17	$18\frac{1}{2}$ in	268 80	$37\frac{1}{2}$ in	1104.5
$\frac{1}{4}$ "	.049	8 "	50 26	19 "	283 52	38 "	1134.1
$\frac{3}{8}$ "	.110	$8\frac{1}{4}$ "	53.45	$19\frac{1}{2}$ "	298.64	$38\frac{1}{2}$ "	1164.2
$\frac{1}{2}$ "	.196	$8\frac{1}{2}$ "	56.74	20 "	314.16	39 "	1194.6
$\frac{5}{8}$ "	.307	$8\frac{3}{4}$ "	60.13	$20\frac{1}{2}$ "	330 06	$39\frac{1}{2}$ "	1225.4
$\frac{3}{4}$ "	.442	9 "	63.61	21 "	346 36	40 "	1256.6
$\frac{7}{8}$ "	.601	$9\frac{1}{4}$ "	67 20	$21\frac{1}{2}$ "	363.05	$40\frac{1}{2}$ "	1288.3
1 "	.785	$9\frac{1}{2}$ "	70.88	22 "	380.13	41 "	1320 3
$1\frac{1}{8}$ "	.994	$9\frac{3}{4}$ "	74 66	$22\frac{1}{2}$ "	397 60	$41\frac{1}{2}$ "	1352.7
$1\frac{1}{4}$ "	1.227	10 "	78.54	23 "	415.47	42 "	1385.4
$1\frac{3}{8}$ "	1.484	$10\frac{1}{4}$ "	82.51	$23\frac{1}{2}$ "	433 73	$42\frac{1}{2}$ "	1418.6
$1\frac{1}{2}$ "	1.767	$10\frac{1}{2}$ "	86 59	24 "	452 39	43 "	1452.2
$1\frac{5}{8}$ "	2.073	$10\frac{3}{4}$ "	90.76	$24\frac{1}{2}$ "	471.43	$43\frac{1}{2}$ "	1486.2
$1\frac{3}{4}$ "	2 405	11 "	95.03	25 "	490 87	44 "	1520 5
$1\frac{7}{8}$ "	2.761	$11\frac{1}{4}$ "	99 40	$25\frac{1}{2}$ "	510.70	$44\frac{1}{2}$ "	1555.3
2 "	3.14	$11\frac{1}{2}$ "	103.86	26 "	530.93	45 "	1590.4
$2\frac{1}{4}$ "	3.97	$11\frac{3}{4}$ "	108.43	$26\frac{1}{2}$ "	551.54	$45\frac{1}{2}$ "	1626.0
$2\frac{1}{2}$ "	4.90	12 "	113.09	27 "	572.55	46 "	1661.9
$2\frac{3}{4}$ "	5.93	$12\frac{1}{4}$ "	117 85	$27\frac{1}{2}$ "	593.95	$46\frac{1}{2}$ "	1698.2
3 "	7.06	$12\frac{1}{2}$ "	122 71	28 "	615.75	47 "	1734 9
$3\frac{1}{4}$ "	8.29	$12\frac{3}{4}$ "	127.67	$28\frac{1}{2}$ "	637.94	$47\frac{1}{2}$ "	1772.1
$3\frac{1}{2}$ "	9.62	13 "	132.73	29 "	660.52	48 "	1809.6
$3\frac{3}{4}$ "	11.04	$13\frac{1}{4}$ "	137 88	$29\frac{1}{2}$ "	683.49	$48\frac{1}{2}$ "	1847.5
4 "	12.56	$13\frac{1}{2}$ "	143 13	30 "	706 86	49 "	1885.7
$4\frac{1}{4}$ "	14.18	$13\frac{3}{4}$ "	148.48	$30\frac{1}{2}$ "	730.61	$49\frac{1}{2}$ "	1924.4
$4\frac{1}{2}$ "	15.90	14 "	153.93	31 "	754 76	50 "	1963 5
$4\frac{3}{4}$ "	17.72	$14\frac{1}{4}$ "	159.48	$31\frac{1}{2}$ "	779 31	$50\frac{1}{2}$ "	2003.0
5 "	19 63	$14\frac{1}{2}$ "	165.13	32 "	804 25	51 "	2042.8
$5\frac{1}{4}$ "	21.64	$14\frac{3}{4}$ "	170.87	$32\frac{1}{2}$ "	829.57	$51\frac{1}{2}$ "	2083.1
$5\frac{1}{2}$ "	23.75	15 "	176.71	33 "	855 30	52 "	2123 7
$5\frac{3}{4}$ "	25.96	$15\frac{1}{4}$ "	182.65	$33\frac{1}{2}$ "	881 41	$52\frac{1}{2}$ "	2164.8
6 "	28.27	$15\frac{1}{2}$ "	188.69	34 "	907 92	53 "	2206.2
$6\frac{1}{4}$ "	30.67	$15\frac{3}{4}$ "	194.82	$34\frac{1}{2}$ "	934 82	$53\frac{1}{2}$ "	2248.0
$6\frac{1}{2}$ "	33.18	16 "	201.06	35 "	962.11	54 "	2290.2
$6\frac{3}{4}$ "	35.78	$16\frac{1}{2}$ "	213.82	$35\frac{1}{2}$ "	989.80	$54\frac{1}{2}$ "	2332.8
7 "	38.48	17 "	226.98	36 "	1017.88	55 "	2375.8
$7\frac{1}{4}$ "	41.28	$17\frac{1}{2}$ "	240.52	$36\frac{1}{2}$ "	1046 4	$55\frac{1}{2}$ "	2419.2
$7\frac{1}{2}$ "	44.17	18 "	254.46	37 "	1075.2	56 "	2463.0

CAPACITIES OF BOILER FEED PUMPS.

Single: Steam Actuated.
Duplex: Steam Actuated.
Triplex: Power.

H. P. of Boiler.	Feed Water at 2120.		Single Pump.		Duplex Pump.		Triplex Pump.	
	Pounds per Hour.	Gallons per Minute.	Size.	Strokes Minute.	Size.	Number Strokes Minute.	Size.	R. P. M.
50	1830	3.8	.....	.....	3	40	2	32
75	2742	5.7	.....	.....	4 1/2	27	2 1/2	24
100	3665	7.6	.....	.....	3	35	x	31
150	5489	11.4	5 1/2 x 3 x 10	27	x	31	x	32
200	7320	15.26	5 1/2 x 3 x 10	41	x	41	x	24
250	9162	19.	6 1/2 x 4 x 10	30	3 1/2	51	x	29
300	10990	22.9	6 1/2 x 4 x 10	38	3 1/2	39	x	36
350	12820	27.	6 1/2 x 4 x 10	46	4	42	x	28
400	14652	30.	7 1/2 x 5 x 12	29	x	31	x	31
500	18310	38.	7 1/2 x 5 x 12	33	x	41	x	38
600	21975	46.	7 1/2 x 5 x 12	41	4 1/2	38	5 1/2	25
700	25642	53.	9 1/2 x 6 x 12	34	4 1/2	44	x	30
800	29300	61.	9 1/2 x 6 x 12	40	5	40	x	25
1000	36625	76.2	11 x 7 x 14	28	x	28	5 1/2	32
1200	43956	92.	11 x 7 x 14	35	6	35	x	24
1500	54940	114.	11 x 8 x 14	45	6	44	x	29
1800	65930	137.4	13 1/2 x 8 x 14	41	x	38	x	35
2000	73259	152.5	13 1/2 x 9 x 18	47	7	33	x	30
2500	91602	191.	13 1/2 x 9 x 18	33	8	40	x	30
3000	109890	229.	16 x 10 x 18	41	x	38	x	36
3500	128200	267.	16 x 10 x 18	41	9	41	x	34
4000	146525	305.	18 x 12 x 24	25	x	33	x	31
4500	164880	343.	18 x 12 x 24	28	11	38	x	35
5000	183156	382.	20 x 14 x 24	24	11	35	10	32
6000	219778	458.	20 x 14 x 24	27	x	43	x	31
7000	256410	534.	20 x 16 x 24	25	12	29	12	31
8000	293044	610.	.....	.....	14	33	x	30
10000	366300	764.	.....	.....	15	36	x	26

EQUIVALENTS OF VARIOUS MEASURES
AND WEIGHTS.

	U. S. Gallon	Imperial Gallon	Cubic Inch	Cubic Foot	Pound	Cwt.	Ton	Liter	Cubic Meter
U. S. Gallon	1.	83	231.	.133	.8.33	.07455	.00372	3.8	.00378
Imp. Gallon	1.2	1.	277.274	.16	10.	.0892	.00446	4.537	.00454
Cubic Inch	.004329	.003607	1.	.00058	.03307	.....	.....	.0163	.....
Cubic Foot	7.48	6.23	1728.	1.	62.35	.557	.028	28.375	.0283
Pound.....	.083	.10	27.72	.016	1.	112.	2240.	.....	.....
Cwt	13.44	11.2	.....	1.8	.....	1.	20	.....	.....
Ton	268.8	224.	.....	35.9	.....	.05	1.	1000.	1.
Liter	.264	.22	61.	.0353	.....	.....	.001	1.	.001
Cubic Meter.....	264.	220.	61028.	35.31	.....	.....	1.	1000.	1.

One Miner's Inch of Water—12 U. S. Gallons per Minute.
One Kilometer—3,273 feet.
One Inch—25.4 Millimeters.
One Centimeter—.3937 Inch.
One Meter—39.37 Inches; 3.281 Feet (act of U. S. Congress).
One Vedros—3.24 U. S. Gallons; 2.7 Imperial Gallons; 750 Cubic Inches.
One Pood—4.32 U. S. Gallons; 3.6 Imperial Gallons; 1,000 Cubic Inches.
A common water pail, filled, contains 19 pounds of water—2.272 U. S. Gallons.

PROPERTIES OF SATURATED STEAM.

(Thomas Pray, Jr., C. E. and M. E.)

Vacuum Gauge, Inches of Mercury	Absolute Pressure in Pounds per Square Inch.	Temperature F.	Cubic Feet in One Pound.	Weight of One Cubic Foot.	Relative Volume to same Weight to Water.	Absolute Pressure in Pounds per Square Inch.	Temperature F.	Cubic Feet in One Pound.	Weight of One Cubic Foot.	Relative Volume to same Weight to Water.
27.9	1	102	319.60	.0031	19951	40	267	10.26	.0974	640
25.9	2	126.3	172.41	.0058	10763	45	274	9.19	.1087	574
23.8	3	141.6	117.72	.0085	7348	50	281	8.32	.1200	519
21.8	4	153	89.80	.0111	5605	55	287	7.61	.1313	475
19.7	5	162.3	72.79	.0137	4544	60	292	7.01	.1425	438
17.8	6	170.1	61.31	.0163	3827	65	298	6.50	.1537	406
15.7	7	176.9	53	.0188	3308	70	303	6.06	.1648	378
13.6	8	182.9	46.77	.0214	2919	75	307	5.68	.1759	355
11.6	9	188.3	41.85	.0238	2613	80	312	5.34	.1871	333
9.6	10	193.3	37.90	.0263	2366	85	316	5.05	.1978	315
7.5	11	197.7	34.65	.0288	2163	90	320	4.79	.2088	298
5.5	12	201.9	31.93	.0313	1993	95	324	4.55	.2197	284
3.5	13	205.8	29.60	.0338	1847	100	327	4.33	.2305	271
1.4	14	209.6	27.62	.0362	1724	105	331	4.14	.2414	258
0.0	14.7	212	26.36	.0379	1645	110	334	3.96	.2522	247
	15	213	25.85	.0386	1614	115	338	3.80	.2630	237
	16	216.3	24.33	.0411	1519	120	341	3.65	.2737	228
	17	219.4	22.98	.0435	1434	125	344	3.51	.2845	219
	18	222.4	21.78	.0459	1359	130	347	3.39	.2951	211
	19	225.2	20.70	.0483	1292	135	350	3.27	.3058	204
	20	227.9	19.72	.0507	1231	140	353	3.16	.3165	197
	21	230.5	18.83	.0531	1176	145	356	3.06	.3271	191
	22	233	18.03	.0554	1125	150	358	2.96	.3376	185
	23	235.4	17.29	.0578	1079	155	361	2.87	.3482	179
	24	237.7	16.61	.0602	1037	160	363	2.79	.3587	174
	25	240	15.99	.0625	998	165	366	2.71	.3694	169
	26	242.1	15.40	.0649	961	170	368	2.63	.3798	164
	27	244.2	14.87	.0672	928	175	370	2.56	.3904	160
	28	246.3	14.37	.0695	897	180	373	2.49	.4009	156
	29	248.3	13.90	.0719	867	185	375	2.43	.4114	152
	30	250.2	13.46	.0742	840	190	377	2.37	.4218	148
	31	252.1	13.05	.0765	815	195	379	2.31	.4323	144
	32	253.9	12.67	.0789	791	200	381	2.26	.4427	141
	33	255.7	12.31	.0812	768	205	383	2.20	.4536	138
	34	257.4	11.97	.0835	747	210	385	2.16	.4636	135
	35	259.1	11.65	.0858	727	215	387	2.11	.4739	132

STEAM AND HEAT.

(William Kent, A. M., M. E.)

The Temperature of Steam in contact with water depends upon the pressure under which it is generated. At the ordinary atmospheric pressure (14.7 lbs. per sq. in.) its temperature is 212° F. As the pressure is increased, as by the steam being generated in a closed vessel, its temperature, and that of the water in its presence increases.

Saturated Steam is steam of the temperature due to its pressure—not superheated.

Superheated Steam is steam heated to a temperature above that due to its pressure.

Dry Steam is steam which contains no moisture. It may be either saturated or superheated.

Wet Steam is steam containing intermingled moisture, mist or spray. It has the same temperature as dry saturated steam of the same pressure.

Heat Required to Generate 1 lb. of Steam from water at 32° F.:

Sensible heat to raise the water from 32° to 212° =

Latent heat, 1st, of the formation of steam at 212° =

2nd. of expansion against the atmospheric pressure,

2116.4 lbs. per sq. ft. × 26.36 cu. ft. = 55,786 foot lbs. ÷ 778 = 71.7

180.9

894.

965.7

Total heat above 32° F.,

1146.6

The Heat Unit or British Thermal Unit is the quantity of heat required to raise the temperature of 1 lb. of water 1° F. at or near its temperature of maximum density (39.1° F.).

One Heat Unit is equivalent to 778 foot pounds of energy.

HORSE-POWER OF AN ENGINE.

Formula for calculating:

$$\frac{A \times p \times 2L \times N}{33,000}$$

- A = Area of piston in square inches.
- p = Average pressure of steam during one stroke, or "mean effective pressure,"
- L = Length of stroke in feet.
- N = Number of revolutions in one minute.
- A = Area of piston = the square of the diameter $\times$.7854.
- p = Average pressure or mean effective pressure is the average pressure on the piston during one stroke.

The average or mean effective pressure is frequently taken at half the boiler pressure for non-condensing engines at $\frac{1}{4}$ cut-off or 40 per cent. at $\frac{1}{5}$ cut-off. Condensing adds 10 to 12 lbs. to the mean effective pressure.

COAL CONSUMPTION.

With fair working boilers different types of engines require fuel about as follows:

Plain slide valve engine	6	lbs.	per	H.	P.	per	hour.
Simple Corliss engine, non-condensing	3 $\frac{1}{4}$	"	"	"	"	"	"
Simple Corliss engine, condensing	2 $\frac{1}{2}$	"	"	"	"	"	"
Compound Corliss engine, non-condensing	2 $\frac{1}{2}$	"	"	"	"	"	"
Compound Corliss engine, condensing	1 $\frac{3}{4}$	"	"	"	"	"	"

ECONOMY OF STEAM ENGINES.

Although the reduction of the fuel bill is the object aimed at in steam engineering, it is not possible to fairly gauge the performance of the engine itself by the amount of coal consumed, the reason being that this is dependent upon the quality of the fuel, the skill of the fireman, efficiency of the boiler, heater, etc., style of furnace, kind of grates, amount of draught, and all of the conditions affecting the economy of the steam plant taken as a whole.

Therefore, it is the rule to determine the economy of the engine by measuring the amount of water consumed per horsepower per hour. As the evaporation of a given quantity of water will always produce the same quantity of steam, this affords a fair method of comparison between different engines working under the same conditions.

The economy of different types of engines working under suitable boiler pressures may be stated in the following terms of pounds of steam per indicated horsepower per hour:

Plain Slide Valve Engines	50
Simple Corliss Engines, non-condensing	26
Simple Corliss Engines, condensing	20
Compound Corliss Engines, non-condensing	20
Compound Corliss Engines, condensing	16

It is, of course, understood that the above results are to be obtained under favorable conditions of size, relation of size to load, speed, steam pressure, temperature of condensing water, etc.

SOME PRACTICAL COTTON MILL ORGANIZATIONS.

Yarn Number.	Card.				Slubber.		Interme- diate.		Roving.		Spinning.		Yarn Number.
	Lap Ounces.	Draft.	Silver Grains.	Silver Hank.	Draft.	Hank.	Draft.	Hank.	Draft.	Hank.	Draft.	Doubling.	
1	18	94	80	.104	4.0	.40					5.2	1	1
2	18	94	80	.104	4.0	.40					10.4	2	2
3	18	94	80	.104	4.4	.45					13.8	2	3
3	18	94	80	.104	4.0	.40					7.8	1	3
4	18	94	80	.104	4.0	.40					10.4	1	4
5	18	94	80	.104	4.0	.40	5.2	1.0			10.4	2	5
5	18	106	70	.119	4.8	.55					9.5	1	5
6	18	106	70	.119	4.0	.45	5.4	1.2			10.4	2	6
6	18	106	70	.119	4.0	.45	4	0.8			7.9	1	6
7	18	106	70	.119	4.0	.45	5.4	1.2			12.1	2	7
7	18	106	70	.119	4.0	.45	4.7	1.0			7.3	1	7
8	18	106	70	.119	4.4	.50	5.8	1.4			11.9	2	8
8	18	106	70	.119	4.4	.50	4.1	1.0			8.3	1	8
9	18	106	70	.119	4.4	.50	6.3	1.5			12.6	2	9
9	18	106	70	.119	4.0	.45	4.7	1.0			9.5	1	9
10	16	102	65	.128	4.0	.50	4.5	1.1	5	2.6	8.1	2	10
10	16	102	65	.128	4.0	.50	4.1	1.0			10.5	1	10
12	16	102	65	.128	4.0	.50	4.5	1.1	5	2.6	9.7	2	12
12	16	102	65	.128	4.0	.50	5.3	1.3			9.7	1	12
14	16	102	65	.128	4.0	.50	4.5	1.1	5.0	2.7	11.1	2	14
14	16	102	65	.128	4.0	.50	5.3	1.3			11.6	1	14
16	16	102	65	.128	4.0	.50	5.1	1.2	6.0	3.4	10.2	2	16
16	14	97	60	.139	4.1	.55	4.1	1.1	4.1	2.1	8.0	1	16
18	16	102	65	.128	4.0	.50	5.5	1.3	6.0	3.8	10.2	2	18
18	16	102	65	.128	4.0	.50	4.5	1.1	5.0	2.6	7.5	1	18
20	14	97	60	.139	4.1	.55	5.4	1.4	6.0	4.1	10.8	2	20
20	16	102	65	.128	4.0	.50	4.5	1.1	5.0	2.6	8.3	1	20
22	14	97	60	.139	4.1	.55	5.4	1.4	6.0	4.1	12.0	2	22
22	16	102	65	.128	4.0	.50	4.5	1.1	5.0	2.6	9.3	1	22
24	12	100	50	.167	4.0	.65	4.9	1.5	6.3	4.6	11.5	2	24
24	16	102	65	.128	4.0	.50	4.5	1.1	5.0	2.6	10.0	1	24
26	12	100	50	.167	4.3	.70	5.0	1.7	6.1	5.0	11.2	2	26
26	16	102	65	.128	4.0	.50	5.1	1.2	5.3	3.0	9.4	1	26
28	12	100	50	.167	4.3	.70	5.0	1.7	6.1	5.0	12.1	2	28
28	12	100	50	.167	4.0	.65	4.4	1.4	5.1	3.5	8.6	1	28
30	12	100	50	.167	4.3	.70	5.0	1.7	6.1	5.0	13.2	2	30
30	12	100	50	.167	4.0	.65	4.5	1.4	5.1	3.5	9.5	1	30

See note on next page.

SOME PRACTICAL COTTON MILL ORGANIZATIONS (Continued).

Yarn Number	Card				Slubber		Interme- diate		Roving		Jack Roving		Spin- ning		Yarn Number
	Lap Ounces	Draft	Sliver Grains	Sliver Hank	Draft	Hank	Draft	Hank	Draft	Hank	Draft	Hank	Draft	Doubling	
32	10	92	45	.185	4.4	.80	5.2	2.0	6.2	6.0			11.8	2	32
34	10	92	45	.185	4.4	.80	5.2	2.0	6.2	6.0			12.5	2	34
36	10	92	45	.185	4.4	.80	5.2	2.0	6.2	6.0			13.2	2	36
38	8	83	40	.208	4.9	1.00	5.2	2.5	5.3	6.5			12.5	2	38
40	10	83	50	.167	4.0	.65	4.4	1.4	5.0	3.4	5.6	9.0	9.8	2	40
45	10	83	50	.167	4.0	.65	4.4	1.4	5.0	3.4	5.6	9.0	11	2	45
50	10	83	50	.167	4.0	.65	4.4	1.4	5.0	3.4	6.2	10.0	11	2	50
55	10	83	50	.167	4.0	.65	4.9	1.5	5.2	3.8	6.0	11.0	11	2	55
60	8	95	35	.238	4.2	.95	4.3	2.0	4.9	4.8	5.2	12.0	11	2	60
65	8	95	35	.238	4.2	.95	4.3	2.0	4.9	4.8	5.7	13.0	11	2	65
70	8	95	35	.238	4.2	.95	4.3	2.0	4.9	4.8	6.0	14.0	11	2	70
75	8	95	35	.238	4.2	.95	4.3	2.0	4.9	4.8	6.5	15.0	11	2	75
80	8	95	35	.238	4.4	1.00	4.9	2.4	5.1	6.0	5.5	16.0	11	2	80
85	8	95	35	.238	4.4	1.00	4.9	2.4	5.1	6.0	5.9	17.0	11	2	85
90	8	95	35	.238	4.4	1.00	4.9	2.4	5.1	6.0	6.2	18.0	11	2	90
95	8	95	35	.238	4.4	1.00	4.9	2.4	5.1	6.0	6.5	19.0	11	2	95
100	6	100	25	.333	4.0	1.30	4.7	3.0	5.1	7.5	5.5	20.0	11	2	100

The drafts in these tables allow for contraction and waste.

Contraction in spinning is variable according to stock and twist. Allowances above are for average warp twist. In spinning filling the drafts should be 3 to 5 points less than in table.

This table is made to illustrate the variations that can be made within the limits of practical drafts on each machine. The range of draft for each machine makes the combinations that are practicable well nigh infinite. At each separate process different superintendents might differ in opinion. Some might prefer more draft at the card and less at the slubber, or more at the spinning and less in the roving. It becomes evident, therefore, that the table can only be worked out for exhibiting to students and apprentices what is the ordinary range in practice. Experinced superintendents will in most cases have preferences of their own, based upon their practice.

APPROXIMATE, PRICE, WEIGHT,
H. P. AND FLOOR SPACE
REQUIRED FOR TEXTILE
MACHINERY.

Machine.	Net sq. ft. Floor Space.	Weight, Pounds.	Horse- Power	Price.
Picker, 1 beater.	100	6,000	4	\$ 750.00
Picker, 2 beater.	140	8,500	6	1,100.00
Picker, 3 beater.	170	11,000	8	1,500.00
Card, 40 inch.	55	7,000	1	675.00
Drawing Frame, per del'y	10	400	$\frac{1}{4}$	60.00
Slubber, 11x5½, 52 sp., per sp.	1½	100	$\frac{1}{30}$	14.00
Intermediate, 9x4½, 100 sp., per sp.	1¼	75	$\frac{1}{40}$	10.00
Roving, 7x3½, 144 sp., per sp.	$\frac{3}{4}$	50	$\frac{1}{50}$	7.00
Jack Roving, 6x3, 176 sp., per sp.	$\frac{3}{4}$	35	$\frac{1}{60}$	6.00
Spinning, 2¾ gauge, per sp.	$\frac{1}{2}$	25	$\frac{1}{70}$	3.40
Spooler, per sp.	$\frac{3}{4}$	40	$\frac{1}{100}$	3 00
Beam Warper.	150	3,000	1	300.00
Slasher.	280	10,000	2	1,500.00
Loom, 40-inch, plain	25	1,000	$\frac{1}{4}$	60.00
Cloth Brusher.	90	8,000	3	1,000.00
Cloth Folder.	50	1,500	$\frac{1}{4}$	350.00
Twister, dry, 3½ gauge, per sp.	$\frac{3}{4}$	30	$\frac{1}{80}$	4.00
Denn Warper, single head	600	3,000	2	1,000.00

The horse powers in above table are based upon average results as observed in actual operations of Southern mills. It is theoretically possible, by having machinery in perfect order, to run with less. In calculating the power necessary to operate any particular mill, the machines should be listed with the power, as above set opposite. The sum total should be increased by 15 per cent. as an average allowance for friction.

The following list shows approximate power required for whole mill for average Southern conditions:

Kind of Goods.	Average No. of Yarn.	Spindles per H. P.
Plain White Cloth, {	6 to 14	18
	14 to 30	20
	30 to 60	21
Two-Ply Yarn. {	6 to 14	20
	14 to 30	22
	30 to 60	25
Single Yarn, {	6 to 14	25
	14 to 30	30
	30 to 60	35

RING SPINNING PRODUCTION TABLE
10 HOURS.

Number.	Weight of 120 Yards.	Square Root.	Warp.			Filling			Warp or Filling.		Number.
			Twist per Inch.	Approx. Size Ring.	Approx. Size Traveler,	Twist per Inch.	Approx. Size Ring.	Approx. Size Traveler.	Revolutions 1 inch Front Roll	Pounds per Spindle in 10 Hours	
4	250.0	2.00	9.50	2¼	12	6.50	1¾		180	2.5	4
5	200.0	2.23	10.62			7.27			176	1.9	5
6	166.7	2.45	11.63			7.96			172	1.6	6
7	142.9	2.65	12.56		10	8.60		8	169	1.3	7
8	125.0	2.83	13.43			9.19			166	1.1	8
9	111.1	3.00	14.25			9.75			163	1.0	9
10	100.0	3.16	15.02	2	8	10.27	1½	6	160	.89	10
11	90.9	3.32	15.75			10.78			157	.79	11
12	83.3	3.46	16.45			11.26			154	.71	12
13	76.9	3.60	17.12			11.72			151	.64	13
14	71.4	3.74	17.77		6	12.16		5	148	.58	14
15	66.7	3.87	18.39	1¾		12.59			145	.53	15
16	62.5	4.00	19.00			13.00			142	.49	16
17	58.8	4.12	19.58		4	13.40			139	.45	17
18	55.5	4.24	20.15			13.79			136	.41	18
19	52.6	4.36	20.70		3	14.17		4	133	.38	19
20	50.0	4.47	21.24			14.53			130	.36	20
21	47.6	4.58	21.76		2	14.89		3	128	.34	21
22	45.5	4.69	22.27			15.24		2	126	.32	22
23	43.5	4.80	22.78			15.59		1	124	.30	23
24	41.7	4.90	23.27		1	15.92			122	.28	24
25	40.0	5.00	23.75			16.25	1¾	2-0	120	.26	25
26	38.5	5.10	24.22	1¾		16.57			119	.25	26
27	37.0	5.20	24.68		1-0	16.89		3-0	118	.24	27
28	35.7	5.29	25.13			17.20			117	.23	28
29	34.5	5.39	25.58			17.50		4-0	116	.22	29
30	33.3	5.48	26.02		3-0	17.80			115	.21	30
31	32.2	5.57	26.45			18.10		6-0	114	.20	31
32	31.2	5.66	26.87			18.38			113	.19	32
33	30.3	5.74	27.29		6-0	18.67		8-0	112	.19	33
34	29.5	5.83	27.70			18.95		10-0	111	.18	34
35	28.6	5.91	28.10			19.23	1¾		110	.17	35
36	27.8	6.00	28.50		10-0	19.50		12-0	109	.17	36
37	27.0	6.08	28.89			19.77			108	.16	37
38	26.3	6.16	29.28	1¾	12-0	20.03		14-0	107	.16	38
39	25.7	6.24	29.66			20.30			106	.15	39
40	25.0	6.32	30.04		15-0	20.55		16-0	105	.15	40
41	24.4	6.40	30.42			20.81			104	.14	41
42	23.8	6.48	30.78			21.06			103	.14	42
43	23.3	6.56	31.14			21.31			102	.13	43
44	22.7	6.63	31.50			21.56			101	.13	44
45	22.2	6.71	31.86		16-0	21.80		17-0	100	.12	45
46	21.7	6.78	32.21	1½		22.04			99	.12	46
47	21.3	6.86	32.56			22.28			98	.12	47
48	20.8	6.93	32.90			22.52			97	.11	48
49	20.4	7.00	33.25			22.75			96	.11	49
50	20.0	7.07	33.58		17-0	22.98		18-0	96	.10	50
51	19.6	7.14	33.92			23.21			95	.10	51
52	19.2	7.21	34.25			23.44			95	.10	52
53	18.9	7.28	34.58			23.66			94	.10	53
54	18.5	7.35	34.91			23.88			94	.10	54
55	18.2	7.42	35.22	1¾	18-0	24.10		19-0	93	.09	55
56	17.8	7.48	35.55			24.32			93	.09	56
57	17.5	7.55	35.86		19-0	24.54		20-0	92	.09	57
58	17.2	7.62	36.17			24.75			92	.09	58
59	16.9	7.68	36.49			24.96			91	.09	59
60	16.7	7.75	36.79		20-0	25.16			91	.08	60

The production is calculated on an average of 10 per cent. allowance.
The warp twist is calculated at 4.75 times the square root of the number, and the filling at 3.25 times the square root of the number.
The sizes of rings and travelers are inserted only to give a general idea. Exact sizes must depend on circumstances.
The front roll speeds are based on average conditions now existing in Southern mills. Other published tables give somewhat faster speed, especially for filling. But to maintain the above standard of twist, no considerable increase in production may be gained by speeds above those given.

YARDS OF COTTON CLOTH PER LOOM,
PER DAY OF TEN HOURS.

Picks per Inches.	PICKS PER MINUTE.										
	150	155	160	165	170	175	180	185	190	195	200
20	125.0	129.2	133.3	137.5	141.7	145.8	150.0	154.2	158.3	162.5	166.7
24	104.2	107.6	111.1	114.0	118.1	121.5	125.0	128.5	131.9	135.4	138.9
28	89.3	92.3	95.2	98.2	101.2	104.2	107.1	110.1	113.1	116.1	119.0
32	78.1	80.7	83.3	85.9	88.5	91.1	93.7	96.4	99.0	101.6	104.2
36	69.4	71.8	74.1	76.4	78.7	81.0	83.3	85.6	88.0	90.3	92.6
40	62.5	64.6	66.7	68.7	70.7	72.9	75.0	77.1	79.2	81.3	83.3
42	59.5	61.5	63.5	65.5	67.5	69.4	71.4	73.4	75.4	77.4	79.4
44	56.8	58.7	60.6	62.5	64.4	66.3	68.2	70.1	72.0	73.9	75.8
46	54.3	56.2	58.0	59.8	61.6	63.4	65.2	67.0	68.8	70.7	72.5
48	52.1	53.8	55.6	57.3	59.0	60.8	62.5	64.2	66.0	67.7	69.4
50	50.0	51.7	53.3	55.0	56.7	58.3	60.0	61.7	63.3	65.0	66.7
52	48.1	49.7	51.3	52.9	54.5	56.1	57.7	59.3	60.9	62.5	64.1
54	46.3	47.8	49.4	50.9	52.5	54.0	55.6	57.1	58.6	60.2	61.7
56	44.6	46.1	47.6	49.1	50.6	52.1	53.6	55.1	56.5	58.0	59.5
58	43.1	44.5	46.0	47.4	48.8	50.3	51.7	53.2	54.6	56.0	57.5
60	41.7	43.1	44.4	45.8	47.2	48.6	50.0	51.4	52.8	54.2	55.6
62	40.3	41.7	43.0	44.4	45.7	47.0	48.4	49.7	51.1	52.4	53.8
64	39.1	40.4	41.7	43.0	44.3	45.6	46.9	48.2	49.5	50.8	52.1
66	37.9	39.1	40.4	41.7	42.9	44.2	45.5	46.7	48.0	49.2	50.5
68	36.8	38.0	39.2	40.4	41.7	42.9	44.1	45.3	46.6	47.8	49.0
70	35.7	36.9	38.1	39.3	40.5	41.7	42.9	44.0	45.2	46.4	47.6
72	34.7	35.9	37.0	38.2	39.4	40.5	41.7	42.8	44.0	45.1	46.3
74	33.8	34.9	36.0	37.2	38.3	39.4	40.5	41.7	42.8	43.9	45.0
76	32.9	34.0	35.1	36.2	37.3	38.4	39.5	40.6	41.7	42.8	43.9
78	32.1	33.1	34.2	35.3	36.3	37.4	38.5	39.5	40.6	41.7	42.7
80	31.3	32.3	33.3	34.4	35.4	36.5	37.5	38.5	39.6	40.6	41.7
82	30.0	31.5	32.5	33.5	34.6	35.6	36.6	37.6	38.6	39.6	40.7
84	29.8	30.8	31.7	32.7	33.7	34.7	35.7	36.6	37.7	38.7	39.7
86	29.1	30.0	31.0	32.0	32.9	33.9	34.9	35.8	36.8	37.8	38.8
88	28.4	29.4	30.3	31.3	32.2	33.1	34.1	35.0	36.0	36.9	37.9
90	27.8	28.7	29.6	30.6	31.5	32.4	33.3	34.3	35.2	36.1	37.0
92	27.2	28.1	29.0	29.9	30.8	31.7	32.6	33.5	34.4	35.3	36.2
94	26.6	27.5	28.4	29.3	30.1	31.0	31.9	32.8	33.7	34.6	35.5
96	26.0	26.9	27.8	28.6	29.5	30.4	31.3	32.1	33.0	33.9	34.7
98	25.5	26.4	27.2	28.1	28.9	29.8	30.6	31.5	32.3	33.2	34.0
100	25.0	25.8	26.7	27.5	28.3	29.2	30.0	30.8	31.7	32.5	33.3
102	24.5	25.3	26.1	27.0	27.8	28.6	29.4	30.2	31.0	31.9	32.7
104	24.0	24.8	25.6	26.4	27.2	28.0	28.8	29.6	30.4	31.3	32.1
106	23.6	24.4	25.2	25.9	26.7	27.5	28.3	29.1	29.9	30.7	31.4
108	23.1	23.9	24.7	25.5	26.2	27.0	27.8	28.5	29.3	30.1	30.9
110	22.7	23.5	24.2	25.0	25.8	26.5	27.3	28.0	28.8	29.5	30.3
112	22.3	23.1	23.8	24.6	25.3	26.0	26.8	27.5	28.3	29.0	29.8
114	21.9	22.7	23.4	24.1	24.9	25.6	26.3	27.0	27.8	28.5	29.2
116	21.6	22.3	23.0	23.7	24.4	25.1	25.9	26.6	27.3	28.0	28.7
118	21.2	21.9	22.6	23.3	24.0	24.7	25.4	26.1	26.8	27.5	28.2
120	20.8	21.5	22.2	22.9	23.6	24.3	25.0	25.7	26.4	27.1	27.8
122	20.4	21.2	21.9	22.5	23.2	23.9	24.6	25.3	26.0	26.6	27.3
124	20.1	20.8	21.5	22.2	22.8	23.5	24.2	24.9	25.5	26.2	26.9
126	19.8	20.5	21.2	21.8	22.5	23.1	23.8	24.5	25.1	25.8	26.5
128	19.5	20.2	20.8	21.5	22.1	22.8	23.4	24.1	24.7	25.4	26.0
130	19.2	19.9	20.5	21.2	21.8	22.4	23.1	23.7	24.4	25.0	25.6

No allowance for stoppage has been made in this table.

TWIST TABLE.

SHOWING THE TWIST PER INCH FOR DIFFERENT KINDS OF YARN.

No. of Yarn.	Frame Warp Twist.	Frame Filling Twist.	Mule Filling Twist.	No. of Yarn.	Frame Warp Twist.	Frame Filling Twist.	Mule Filling Twist.
1	4.75	3.20	3.50	29	25.57	17.23	18.84
2	6.71	4.52	4.94	30	26.01	17.52	19.16
3	8.21	5.54	6.06	31	26.44	17.81	19.48
4	9.50	6.40	7.00	32	26.86	18.09	19.79
5	10.62	7.15	7.82	33	27.28	18.38	20.40
6	11.63	7.83	8.57	34	27.69	18.65	20.10
7	12.56	8.46	9.25	35	28.10	18.93	20.70
8	13.43	9.04	9.89	36	28.50	19.20	21.00
9	14.25	9.60	10.50	37	28.88	19.46	21.28
10	15.01	10.11	11.06	38	29.27	19.72	21.57
11	15.75	10.61	11.60	39	29.65	19.98	21.85
12	16.45	11.08	12.12	40	30.03	20.23	22.13
13	17.12	11.53	12.61	41	30.41	20.48	22.41
14	17.76	11.97	13.09	42	30.78	20.73	22.68
15	18.39	12.39	13.55	43	31.14	20.98	22.94
16	19.00	12.80	14.00	44	31.55	21.22	23.21
17	19.58	13.19	14.43	45	31.86	21.46	23.47
18	20.14	13.57	14.84	46	32.21	21.70	23.73
19	20.70	13.94	15.25	47	32.56	21.93	23.99
20	21.24	14.31	15.65	48	32.95	22.16	24.24
21	21.76	14.66	16.03	49	33.25	22.40	24.50
22	22.27	15.00	16.41	50	33.58	22.62	24.74
23	22.77	15.34	16.78	52	34.25	23.07	25.23
24	23.26	15.67	17.14	54	34.90	23.51	25.71
25	23.75	16.00	17.50	56	35.54	23.94	26.19
26	24.22	16.31	17.84	58	36.17	24.36	26.65
27	24.68	16.62	18.18	60	36.78	24.78	27.10
28	25.13	16.93	18.51				

TWIST TABLE.
SHOWING THE TWIST PER INCH FOR DIFFERENT KINDS
OF TWISTED YARNS.

No. of Yarn to be Twisted.	2 Ply.	3 Ply.	4 Ply.	5 Ply.	6 Ply.	No. of Yarn to be Twisted.	2 Ply.	3 Ply.	4 Ply.	5 Ply.	6 Ply.
1	2.83	2.30	2.00	1.79	1.65	37	17.20	14.04	12.16	10.88	9.94
2	4.00	3.28	2.83	2.53	2.30	38	17.43	14.24	12.33	11.03	10.06
3	4.90	4.00	3.46	3.10	2.83	39	17.66	14.42	12.49	11.17	10.20
4	5.66	4.61	4.00	3.58	3.28	40	17.89	14.60	12.65	11.31	10.33
5	6.32	5.17	4.47	4.00	3.64	41	18.11	14.79	12.81	11.46	10.45
6	6.93	5.66	4.90	4.38	4.00	42	18.33	14.96	12.96	11.59	10.58
7	7.48	6.10	5.29	4.73	4.33	43	18.55	15.14	13.12	11.73	10.71
8	8.00	6.54	5.66	5.06	4.61	44	18.76	15.32	13.26	11.87	10.83
9	8.48	6.93	6.00	5.37	4.90	45	18.97	15.49	13.42	12.00	10.96
10	8.94	7.30	6.32	5.66	5.17	46	19.18	15.66	13.56	12.13	11.08
11	9.38	7.66	6.63	5.93	5.41	47	19.39	15.84	13.71	12.26	11.19
12	9.80	8.00	6.93	6.20	5.66	48	19.59	16.00	13.86	12.39	11.31
13	10.20	8.32	7.21	6.45	5.89	49	19.80	16.16	14.00	12.52	11.43
14	10.58	8.64	7.48	6.69	6.10	50	20.00	16.33	14.14	12.65	11.54
15	10.96	8.94	7.75	6.93	6.32	51	20.20	16.49	14.28	12.78	11.66
16	11.31	9.24	8.00	7.16	6.54	52	20.40	16.65	14.42	12.90	11.78
17	11.66	9.52	8.25	7.38	6.73	53	20.59	16.82	14.56	13.02	11.89
18	12.00	9.80	8.48	7.59	6.93	54	20.78	16.97	14.70	13.14	12.00
19	12.33	10.06	8.72	7.80	7.12	55	20.98	17.12	14.83	13.26	12.11
20	12.65	10.33	8.94	8.00	7.30	56	21.16	17.28	14.96	13.39	12.22
21	12.96	10.58	9.16	8.20	7.48	57	21.36	17.43	15.10	13.50	12.33
22	13.26	10.83	9.38	8.39	7.66	58	21.54	17.59	15.23	13.62	12.44
23	13.56	11.08	9.59	8.58	7.83	59	21.72	17.74	15.36	13.74	12.54
24	13.86	11.31	9.80	8.76	8.00	60	21.91	17.89	15.49	13.86	12.65
25	14.14	11.54	10.00	8.94	8.17	61	22.09	18.04	15.62	13.97	12.76
26	14.42	11.78	10.20	9.12	8.32	62	22.27	18.18	15.75	14.08	12.86
27	14.70	12.00	10.39	9.30	8.48	63	22.45	18.33	15.88	14.20	12.96
28	14.96	12.22	10.58	9.46	8.64	64	22.62	18.47	16.00	14.31	13.06
29	15.23	12.44	10.77	9.63	8.79	65	22.80	18.62	16.12	14.42	13.16
30	15.49	12.65	10.96	9.80	8.94	66	22.98	18.76	16.25	14.53	13.26
31	15.75	12.86	11.14	9.96	9.10	67	23.15	18.90	16.37	14.64	13.37
32	16.00	13.06	11.31	10.12	9.24	68	23.32	19.04	16.49	14.75	13.46
33	16.25	13.26	11.49	10.28	9.38	69	23.50	19.18	16.61	14.86	13.56
34	16.49	13.46	11.66	10.43	9.52	70	23.66	19.32	16.73	14.96	13.66
35	16.73	13.66	11.83	10.58	9.66	71	23.83	19.46	16.85	15.07	13.76
36	16.97	13.86	12.00	10.73	9.80	72	24.00	19.59	16.97	15.18	13.86

The above table is the one generally adopted although it is frequently varied to meet individual requirements.

TABLE BREAKING STRENGTH RING
SPUN WARP YARN

Pounds to Break one Skein of 120 Yards.										
Yarn No. Single 2 Ply	4 400 900	5 350 800	6 300 650	7 250 550	8 220 500	9 200 450	10 180 400	11 160 350	12 140 300	13 130 280
Yarn No. Single 2 Ply	14 120 260	15 115 250	16 110 240	17 105 230	18 100 220	19 95 210	20 90 200	21 85 190	22 80 180	23 75 175
Yarn No. Single 2 Ply	24 72 170	25 69 165	26 66 158	27 68 151	28 61 146	29 59 141	30 57 137	31 55 133	32 53 129	33 52 125
Yarn No. Single 2 Ply	34 51 122	35 50 119	36 49 116	37 48 113	38 47 110	39 46 108	40 45 106	41 44 104	42 43 102	43 42 100
Yarn No. Single 2 Ply	44 41 98	45 40 96	46 40 94	47 39 92	48 31 91	49 38 90	50 37 89	52 36 87	54 35 85	60 32 79

Breaking strengths vary according to character of cotton from which yarn is made. They vary according to twist put in yarn. They appear to vary according to the way in which the testing machine is used.

The above strengths are about the average for the kind of cotton used to make the designated numbers.

COTTON MILL RULES.

To find the "hank" of roving.

Divide 100 by the weight in grains of 12 yards.

To find the number of yarn.

Divide 1,000 by the weight in grains of 120 yards.

To find circumference of a roll.

Multiply diameter by 3.1416 or, for an approximation, 3 1-7.

To find approximate production of spinning and roving machinery.

Multiply diameter of front roll by the speed and divide by 16. Result is possible hanks per spindle in 10 hours, without allowance for stops.

Or, multiply diameter of front roll by speed, and divide by the hank or number. Result is possible ounces per spindle per day of 10 hours, without allowance for stop.

NOTE.—In all calculations with gears, the "driver may for convenience be

COTTON MILL RULES (Continued).

assumed to be at either end of the train, without regard to where the actual power is applied.

To find draft of spinning or roving frame.

Consider gear on back roll the driver (1) multiply the diameter of front roll by all the drivers, (2) Multiply the diameter of back roll by all the drivens. Divide (1) by (2).

To find draft constant on spinning or roving frame.

Proceed as in last rule, leaving the draft gear out of the calculation.

To find twist on spinning frame.

Consider gear on front roll the driver. (1) Multiply diameter in cylinder by all the drivers. (2) Multiply diameter of spindle whorl by all the drivens and by circumference of front roll. Divide (1) by (2).

To find twist constant on spinning frame.

Proceed as in last rule, leaving twist gear out of the calculation.

To find draft gear to use when changing from one number to another.

Multiply number being spun by draft gear in use. Divide by number to be spun.

To find twist gear to use when changing from one number to another.

Multiply twist gear in use by the twist per inch in the stock being spun. Divide by twist per inch in the stock to be spun.

Or multiply twist gear in use by square root of number being made. Divide by square root of number to be made.

NOTE.—The rule now in common use is as follows: “Multiply square of twist gear in use by number being spun. Divide by number to be spun. Extract square root of result.”

This involves the work of squaring a number and of taking square root of a number. The rule in the text only involves looking up square roots of yarn (or roving) numbers in the tables.

To find draft when a draft constant is known.

Divide constant by draft gear.

To find draft gear to use when draft constant is known.

Divide constant by draft required.

To find twist when twist constant is known.

Divide constant by twist gear.

To find twist gear to use when twist constant is known.

Divide constant by twist required.

NOTE.—For exceptions to the rules about constants, see paragraph 70, Cotton Mills, Processes and Calculations, (See Adv. Page.)

HORSE-POWER TO DRIVE OIL MILL ELEVATORS.

The approximate horse-power required to elevate a given quantity of material may be obtained by the following rule:

The capacity of elevators being generally given in bushels per hour, find the number of *pounds* elevated per hour by multiplying the number of bushels by the weight of each bushel; dividing this by 60 will give the number of pounds lifted per minute.

Multiply the number of pounds lifted per minute by the height of the elevator and divide the product by 33,000. The result will give the theoretical horse-power necessary, to which should be added 50 per cent. for friction.

HORSE-POWER TO DRIVE OIL MILL CONVEYORS.

The approximate horse-power required to drive Caldwell Conveyors may be determined by the following rule:

The capacity of conveyor being generally given in bushels per hour, find the weight of the material to be carried by multiplying the number of bushels by the weight per bushel. Divide by 60 to find the weight to be carried per minute. Multiply the result by the length of the conveyor in feet, divide the product by 33,000 and divide by 3. The result will be the horse-power required.

SPEED OF OIL MILL ELEVATORS.

The following table indicates speed of belt permissible over different sizes of pulleys:

Diameter of Pulley. Inches.	Belt Speed in Feet Per Minute.	Speed of Head Shaft. Revolutions Per Minute.
16	200	48
18	215	45
20	220	42
24	250	40
30	300	38
36	340	36
40	360	34
48	400	32
54	440	31
60	470	30
72	600	30

TRANSMITTING EFFICIENCY OF SHAFTING
AT DIFFERENT SPEEDS.

AS SECOND MOVERS OR LINE SHAFTING, BEARINGS
EIGHT FEET APART.

Diam. of Shaft in Inches.	Number of Revolutions per Minute.										
	100	125	150	175	200	225	250	275	300	325	350
	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.
1 1/2	6.7	8.4	10.1	11.8	13.5	15.2	16.8	18.5	20.2	21.9	23.6
1 11/16	10.7	13.4	16	18.7	21.5	24.2	26.8	29.5	32.1	34.8	39
1 13/16	16	20	24	28	32	36	40	44	48	52	56
2 3/16	22	28	34	39	45	50	56	61	68	74	80
2 1/2	31	39	47	54	62	69	78	86	93	101	109
2 11/16	41	52	62	73	83	93	104	114	125	135	145
2 13/16	54	67	81	94	108	121	134	148	162	175	189
3 7/16	85	107	128	150	171	192	214	235	257	278	300

BOYS AND YOUNG MEN.

We get inquiry, multifold, from boys, young men, fathers, mothers, other relatives and friends asking for advice about the best course for the boys and young men to pursue to insure success in life. In many, many cases we are asked to undertake the guidance of these boys and young men. Many of them offer to go to work for nothing or promise to carry out our recommendations to the letter, no matter what they are.

These suggestions or requests come sometimes by letter, often by visits and word of mouth, and in other ways. We are deeply impressed with the earnestness and the zeal of the boys and young men. In many cases this zeal is short-lived. Perhaps it is in most cases short-lived. On the other hand it is, in many cases, earnest and life-long and of enduring quality.

Many of the young college men have the highest promise of usefulness. These will in time command position and emolument. Very many college men are already irredeemable victims of the delusion that their college education entitles them to position and salary and that it ought to command both. The thing which most parents are willing to spend money for, in the name of education, in preparation, in the way of teaching and training for their sons, is: (1) to make easily and comfortably a good living for themselves and families; (2) such other success as the best teaching and training, together with natural endowments, lead to. The parent is usually chiefly concerned about the first only. In all consideration of this subject the second clause of the above purpose may be entirely omitted here because it concerns so very few and because those who pass the first condition don't need any advice as to the second which acts automatically or not at all.

The planter's son, in ante-bellum days, had better training and teaching to prepare him for his future life than, perhaps, any other class in the nineteenth century. From the very cradle he began an apprenticeship in the trade of agriculture. From the cradle to the beginning of his college days he lived in close contact with the trade and with the labor which he would be subsequently called upon to control and direct. Whether he was required to do so or not he would, as a boy, learn to plow, chop out cotton, flood or drain rice land, cure tobacco or gin cotton. He was a friend of all the labor on the home farm or plantation and also on adjacent plantations. He rode mules, raced horses, drove six-mule teams with one line, swam, hunted, fished, wrestled and otherwise labored and played with the negroes. He went to common country schools and at 16 years old was usually the most capable and resourceful practical working man on the plantation. If nobody else could ride a balking mule or plow a straight furrow over rough land, he could and he could in patience teach others. Add to this apprenticeship a college education and the product was usually a high class planter of cotton, rice, tobacco or sugar. All the young men who were sound of body and mind and had reasonable energy attained to this degree of success. Then those who were specially endowed with talents and energies or in whose way special opportunity came, achieved fame as soldiers, statesmen or in some of the professions. They were all well prepared to make the most of higher opportunity, or to live in patience if higher opportunity never came.

In these modern times the conditions as to preparation surrounding success, are still the same. Agriculture is not the monopoly it used to be. We are coming to be a people who are manufacturers. The boy or youth who would succeed best in manufacture must be both practical and technical. He must serve an apprenticeship and also, have some education.

Of two boys, one having served an apprenticeship but having no college educa-

tion, the other having a college education but no practical training, the former is most useful and will in most cases make the best ultimate success.

The boy having a modicum of training and a modicum of education is better than either. This is the one with a common school education and an apprenticeship or its equivalent in practical work. The best qualified youth of all is the one who has served a full apprenticeship and has a full technical education.

Any ordinary machine shop, any ordinary cotton mill, any ordinary cotton oil mill, any ordinary furniture factory, any ordinary rolling mill, is good enough for the apprenticeship in manufactures, just as any ordinary farm is for agriculture. With rare exceptions, any college is good enough for the teaching. It is not necessary for the boy or youth to be working for or under the direction of a man who has already succeeded. It seems probable that this is actually injurious, because it is relied on as a factor in success whereas it has no important influence for advantage and perhaps some considerable for disadvantage.

Review the biography of successful men and it is not once in a thousand times that success will be found due to a person having been a worker under a notably successful man. On the contrary the record of human success is more notably one of scant opportunity and hard labor. It is mostly a record of apprenticeship perforce, of the acquisition of knowledge under adverse influences, whether their teaching was at home by books and by the light of lightwood knots or in college with scant funds. The record shows that even the apprenticeship on a farm is far better than a college education when each is taken separately but when taken together the product sweeps the field for success.

We recommend that any boy who contemplates an occupation in industrial life be sent to the common schools up to the age of 15 years. That then he be apprenticed in some trade, such as machinist, pattern maker, moulder, carpenter, or other for a period of three years. That then he go to college, if the money is available, for four years. That on graduation he go into a factory in the particular line he wishes to follow, cotton mill, oil mill, furniture factory, or other, for a period of two years. This would produce a young man at 24 to 25 years who would be competent to direct manufacture in his line and would command the respect of all decent labor and who could afford to ignore or control all other labor.

A boy starting in on this course at 12 years of age and finishing at 24 years of age would never become infected with the thirst for position and advancement with which so many young college men are saturated.

Invested capital and fame are both as shy as a worthy young girl of those who think that they can be attained easily. Neither ever heeds the knocks of those who are overconfident or impatient. Both love the man of achievement—the modest man. To him who can spin a better yarn or weave a better cloth than the average, who is interested in his work and faithful to his duty, capital and fame are alike willing slaves, indeed both are eager slaves.

Whatever doubts may exist as to the advantages or disadvantages of collegiate education, there is no doubt about the importance and value of practical training for a youth whether with or without a college education. There is no doubt that a common school education with a good apprenticeship makes a better qualification for a young man than does a college education without the practical training. The practice or apprenticeship is necessary to produce, (1) a physique capable of patient work without irksomeness; (2) a ripe sound judgment for dealing with all kinds of humanity, and (3) a knowledge that wages and salaries must be proportioned to results.

Neither practical training nor technical education, nor both together, can give entirely satisfactory results for manufacturing pursuits, without the following qual-

ities besides, viz.: (1) Some natural endowment, (2) a good moral development, (3) enduring integrity, (4) persevering energy, and (5) a prudent judgment.

All these qualities except the first are usually the product of home influences.

Nothing here written is meant to deprecate college or other technical education. It is intended, however, to emphasize the importance of good practical training in late boyhood and early youth in order that with or without a college education, a young man may start in life with that capability of self-support which all parents wish for their boys.

Technical education is of tremendous advantage to the commonwealth regardless of what value may accrue to the individual graduate. Every graduate, if he comes in contact with practical fellows, disseminates technical knowledge. The clear-headed practical fellow needs no more than a hint on a point here and a point there to enhance very much his own efficiency and usefulness. To the graduate the education begins to become of leading advantage at an average of, say, 30 years of age. In the twenties the fellow who has had a common school education and a first-class practical training will usually surpass the college graduate. In the latter part of the twenties (years of age) the graduate begins to catch up with his practical competitors and his college education begins to work to his advantage. Other things being the same, the college graduate will after 30 years of age have the advantage. This assumes a college graduate who has had an apprenticeship in youth and who went practically to work after graduation. The graduate who has had no apprenticeship or practical experience up to, say, 22 years of age, is heavily handicapped.

It was, in former generations, the habit for parents to make their boys do some work even in their school periods. This is still more or less the habit of farmers in the country and it is notable that the boys from the farm are the best source of supply for positions which require good work and good sound judgment. In this time the parents who live in cities send their boys to schools punctiliously enough, but let them acquire a habit and a taste for loafing about town in any waking hours not required at school. In this lies the great harm to the boy. These boys go through the public schools and then through college and then want positions. What can these do? Absolutely nothing. The incapacity of these is emphasized by the fact that in many instances their teachers and the professors saturate them with the idea that the school and the college is the whole thing. In these cases the graduates have this error to unlearn and some of them never get so far as to unlearn it. It is a hardship on the best of them to have to unlearn it. If the parent could be brought to make the boy learn, when yet a boy, what work is, and the teachers would refrain from emphasizing too much the value of education and emphasize more the importance of hard work, it would be an advantage in every particular in helping a young man to start in life. Teachers should especially avoid giving the idea to boys or young men that on graduation they will be qualified for and entitled to "positions." It should be made plain to students that a college course is only one of many factors in the education of a young man for a life-work and that there is much to do in the way of hard work before and after graduation to make a whole useful man.

Happily, there is in the growing industrial system, ample room for all the young men who have practical training and can do things whether these have only a common school education or a college education. And the more this industrial system grows large and strong the less room there is in it for the man who can work but knows nothing, or, for the man who is highly educated but who can do nothing.

If the question arise in the mind of the reader as to what this subject has to do with our business we answer such interrogatory with the statement that in our regular mail we get many letters relating to this subject, and are interested in the future welfare of the boys and young men and also in the general development of the country's resources.

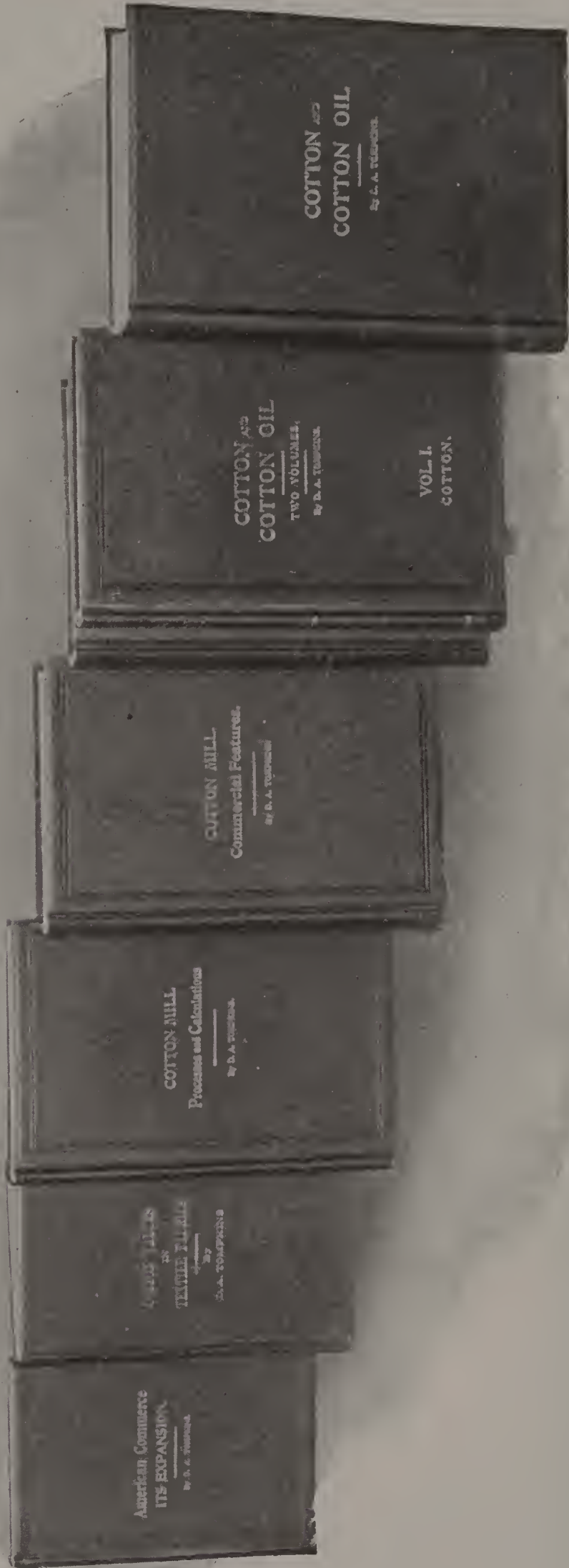


Figure 707.
New Books by D. A. Tompkins.

AMERICAN COMMERCE: ITS EXPANSION.

BY D. A. TOMPKINS.

154 Pages.

Price \$1.00, Postpaid.

This is a collection of addresses and pamphlets relating to the extension of foreign markets for American manufactures. The cotton factories of the United States are now manufacturing more goods than can possibly be consumed in our home markets. It is, therefore, necessary that we reach out for the markets of the world.

This book is a discussion of the ways and means for accomplishing these ends. All manufacturers should be interested in it.

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This is a collection of actual samples of cloth, with descriptive matter and data, showing cost per yard and per pound. These costs are then tabulated in a way to show what the average cotton crop of the State of North Carolina would bring if manufactured into the various kinds of goods shown.

Samples and figures show that there is an easy possibility of five billion dollars in a half million bale crop, if sufficient skill and industry are brought to bear on the subject.

This book does not enter into methods of developing the skill and industry, but merely points out what immense resources are latent in cotton.

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COTTON MILL PROCESSES AND CALCULATIONS.

BY D. A. TOMPKINS.

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This is a book for the Mill Superintendent, the Overseer, and the Student who wants to learn the details of the business of running a Cotton Mill. It is written in simple style, and without the use of algebra. Anyone who understands the simple rules of arithmetic may easily master it. It is profusely illustrated with original drawings.

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BY D. A. TOMPKINS.

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INDEX.

A

Accumulators, hydraulic	336-337
Adjustable ball and socket line hangers, ring oiling	122
Adjustable jaw vises, patent.....	265
Advice to customers	6
Advertising plates, corner stones, tablets and	468
Air cocks	186
Air compressors, rock drills and.....	284
Air pumps, combined jet condensers and	73
Air valves, automatic.....	92
Ampere plug cut-outs, 60	424
Angle straight shank drills, increase twist or constant	213
Annunciators	441
Apparatus, gas lighting	453-454
Appliances, soldering	428-429
Approximate price, weight, H. P. and floor space required for textile machinery..	480
Appurtenances, boilers, engines, etc..23 to 60	
Arbors and taper split sleeves for Pratt's chucks, center	211
Arc lamps, enclosed	395 to 397
Areas of circles, table of.....	473
Arresters, lightning	430
Artesian well engines	68-69
Asbestos cement	162
Asbestos pipe covering	162
Asphalt floors, cement and.....	466
Attachments, link belting and.....	358
Attrition mills	341-342
Auger ratchets	219
Automatic air valves	92
Automatic change valves.....	333 to 335
Automatic drop	445
Automatic engines	44-45
Automatic engines, compound	46
Automatic engines, table of horse power of	45
Automatic grease cup, Ideal	237
Automatic heat regulators	87
Automatic injector, Metropolitan.....	246
Automatics, keys and mats for gas.....	454
Automatic press valves	331-332
Automatic receiver and feed pump.....	72
Automatic sprinklers	103
Automatic sight-feed lubricator, Detroit...	235

B

Back-pressure valve, improved noiseless..	251
Back-pressure valve, semi-balanced....	252-253
Back-pressure valve, the Davis noiseless..	254
Baling press, cotton seed hull.....	343-344
Baling press, lint	345
Ball and socket floor stands, ring-oiling...	127
Ball and socket head shaft hangers, ring- oiling	121
Ball and socket heavy floor stands, ring- oiling	126
Ball and socket line hangers, ring-oiling adjustable	122
Ball and socket post hangers, ring-oiling..	123
Ball and socket pillow blocks, ring-oiling..	124
Band Machine, Tompkins.....	461
Bar iron extras	285
Bars, grate	39
Base switch, hollow wood.....	452
Batteries	438-439
Baxter's "S" wrenches	230
Bearing, concealed collar, recessed.....	119
Bearings, closed ends	119
Bearings, directions for using ring-oil....	120
Bearings, self-oiling	120
Bell chime whistles, single.....	264
Bell or spigot ends, iron-body water gates, composition mounted	208
Bells	442 to 444
Belt tighteners	141
Belting	145
Belting and attachments, link.....	358

Belting, elevator bucket bolts for link....	360
Belting, special canvas-stitched.....	360
Bibbs, compression hose	185
Blacksmiths' forges	283
Blades, hack saw	231
Blocks, duplex	281
Blocks, ring-oiling ball and socket pillow..	124
Blocks, rigid pillow.....	125
Blocks, triplex chain	280
Body oil pump, glass.....	240
Body valves, Jenkins Bros., iron.....	190
Boiler feed pumps, capacities of.....	474
Boiler feed pumps, duplex.....	62-63
Boiler feed pumps, triplex.....	64-65
Boiler fronts	36-37
Boiler, hot water	83
Boiler ratchets	219
Boiler tubes, standard lap-welded.....	163
Boiler, vertical tubular.....	40-41
Boilers, engines and appurtenances..	23 to 60
Boilers, fixtures, regular	26
Boilers, horizontal return tubular station- ary	25-26
Boilers, open-bottom portable.....	34
Boilers, setting for stationary half-arch front	27-28
Boilers, setting for stationary full-arch front	30-31
Boilers, standard return tubular.....	24
Boilers, steam	82
Boilers, water-bottom, portable.....	33
Boilers, water tube	35
Boilers, with full-arch fronts, measurements for setting stationary	32
Boilers, with half-arch fronts, measure- ments for setting stationary.....	29
Boll screens, Tompkins sand and.....	298-299
Bolts, elevator bucket	359
Bolts for link belting, elevator buckets...	360
Bolts, hanger	270
Bolts, machine and car.....	268-269
Books, new	492 to 494
Boring machine, portable	57 to 60
Boxes, conveyor	355-356
Boys and young men.....	489 to 491
Bracket fans	394
Branch tees	175-176
Brass cocks, standard	186-187
Brass valves, standard.....	186 to 189
Breakers, circuit	406-407
Breaking strength ring spun yarn, table of	485
Bronze stamped metal pushes.....	446
Brushes, dynamo	430
Bucket bolts, elevator	359
Bucket bolts for link belting, elevator....	360
Buckets, elevator	359
Bull-Dog vises, machinists	265
Button cord, pear push.....	450
Buttons, pear-shaped push.....	449-450
Buttons, wood push	447-448
Buzzers	445

C

Cables and cord, lamp.....	432
Cake crackers	339-340
Cake former	321
Canvas-stitched belting, special.....	360
Capacities of boiler feed pumps.....	474
Cap screws.....	274-275
Car and machine bolts.....	268-269
Carbons	430
Case-hardened iron set screws.....	272-273
Cast iron fittings	168 to 174
Cast iron water and gas pipe.....	166-167
Casting, mill	465
Cartridge fuse cut-outs	423
Ceiling fans	392-393
Ceiling plates, patent	185
Cement, asbestos	162
Cement and asphalt floors	466
Center arbors and taper split sleeves for Pratt's chucks	211

INDEX.

- Century improved steam separator, new.. 258
Chain blocks, triplex 280
Chain elevators, sprocket..... 357
Change valves, automatic..... 333 to 335
Chapman receptacle, the..... 420
Check valves, iron-body..... 202-203
Check valves, Jenkins Bros.'..... 190-191
Chime whistles, single bell..... 264
Christoffel coil tube cleaners..... 220
Christoffel elliptical tube cleaners..... 220
Chucks, center arbors and taper split sleeves
for Pratt's 211
Chucks, Pratt's patent improved positive
driving drill 210
Chuck, Westcott's patent IXL independent
lathe 209
Circles, table of areas of..... 473
Circuit breakers 406-407
Cisterns and vats 110
Clamp, table 448
Clay and semi-porcelain tubes..... 434
Cleaner, cotton seed 297
Cleaners, Christoffel coil tube..... 220
Cleaners, Christoffel elliptical tube..... 220
Cleaners, elastic tube 220
Cleaners, flue 219-220
Cleaners, Ingalls' tube 220
Cleaners, McLaughlin's steam tube..... 219
Cleaners, Robinson's steam tube..... 219
Cleats, one wire 433
Cleats, two and three wire..... 433
Closed end bearings 119
Cloth per loom, yards of cotton..... 482
Cloth, press 364
Clutch couplings 116
Clutch, Orton 117
Coal consumption 477
Cochrane horizontal separator..... 258
Cocks, air 186
Cocks, gauge 232
Cocks, special iron 193-194
Cocks, standard brass 186-187
Cocks, standard iron 192-193
Coe's wrenches 230
Coil tube cleaners, Christoffel..... 220
Cold punched nuts..... 277
Collar, recessed bearing concealed..... 119
Collins compression couplings, improved . 114
Collars, steel loose 118
Columns, water gauge..... 231
Combination foot push 448
Combined jet condensers and air pumps.. 73
Commutator compound and tape..... 428
Composition mounted, bell or spigot ends,
iron-body water gates..... 208
Composition mounted double gate valves,
iron body 206-207
Composition standard wedge gate valves.. 204
Composition wedge gate valves, hose ends 205
Compound and tape, commutator..... 428
Compound automatic engines..... 46
Compound Corliss engines, indicated horse-
power of standard 52-53
Compression couplings, Collins improved. 114
Compression couplings, ribbed..... 113
Compression fire hydrant, standard..... 104
Compression hose bibbs 185
Compressors, rock drills and air..... 284
Concealed collar, recessed bearing..... 119
Condensers and air pupms, combined jet.. 73
Connected direct pumps 388-389
Connected direct units 390-391
Connections, pump and press..... 330
Constant angle straight shank drills, in-
crease twist or 213
Consumption, coal 477
Contracting and engineering..... 13 to 22
Conveyor boxes..... 355-356
Conveyors 350 to 352
Conveyors, horse-power to drive oil mill. 487
Conveyors, lining 353
Cooking heaters..... 312 to 319
Cord and cables, lamp..... 432
Cord, pear push button..... 450
Corliss engines, indicated horsepower of
standard compound 52-53
Corliss engine repairs..... 47
Corliss engine, standard 48 to 53
Corliss engines, table of standard sizes of
simple 49
Corner stones, tablets and advertising
plates 468
Cotton cloth, per loom, yards of..... 482
Cotton ginning 368-369
Cotton mill organizations, practical.... 478-479
Cotton mill rules..... 485-486
Cotton presses and gins 370
Cotton seed cleaner 297
Cotton seed delinting machines.... 346 to 348
Cotton seed hull baling press..... 343-344
Cotton seed hull packer..... 344
Cotton seed linter 300
Cotton seed oil mill machinery.... 287 to 296
Couplings, clutch 116
Couplings, flange 115
Couplings, improved Collins compression.. 114
Couplings, ribbed compression..... 113
Couplings, universal 116
Couplings, wrought iron 182
Covering, asbestos pipe..... 162
Crackers, cake 339-340
Crusher rolls..... 308 to 311
Cup, ideal automatic grease 237
Cup Pioneer slide top glass oil..... 238
Cup, Royal sight-feed glass oil..... 239
Customers, advice to..... 6
Cut-outs, cartridge fuse..... 423
Cut-outs, duplex feeder slate..... 427
Cut-outs, Edison plug 423
Cut-outs, fixture 421
Cut-outs, 60-ampere plug..... 424
Cut-outs, 500-volt railway..... 425
Cutters, patent 154-155
Cutters, pipe 227-228
Cutting and threading pipe, price list.... 165
Cutting and threading machines, pipe.. 221-222
Cylindrical and urn-shaped glasses..... 241
- ## D
- Damper regulator, improved..... 256
Davis noiseless, back pressure valve, the.. 254
Deep-well pumps 68 to 71
Delinting machines, cotton seed.... 346 to 348
Detector, watchman's time 440
Detroit automatic sight-feed lubricator .. 235
Detroit sight-feed lubricator 236
Derricks 282
Die, pipe stocks and..... 224
Die plates 225
Die stocks, geared solid..... 223
Different speeds, transmitting efficiency of
shafting at 488
Direct connected drills 388
Direct connected pumps 389
Direct connected units..... 390-391
Directions for setting and operating pumps
..... 74-75
Directions for using ring-oil bearings.... 120
Door and window springs..... 450-451
Door fixtures, fire 107
Door openers 452
Double gate valves, iron-body composition
mounted 206-207
Double tube injector, universal..... 244-245
Drawing-in frame, Tompkins..... 462
Drill chucks, Pratt's patent improved posi-
tive driving 210
Drill press, improved 20-inch National .. 150
Drill presses, improved 32, 36 and 42-inch
standard 151
Drills and air compressors, rock..... 284
Drills, direct connected..... 388
Drills, genuine Packer ratchet..... 219
Drills, increase twist or constant angle
straight shank 213
Drills, Packer taper socket ratchet..... 218

INDEX.

Drills, patent increase twist.....	212
Drills, pipe taps, reamers and.....	230
Drive oil mill conveyors, horse-power to..	487
Drive oil mill elevators, horse-power to..	487
Driving drill chucks, Pratt's patent im- proved positive	210
Drop, automatic	445
Duplex blocks	281
Duplex boiler feed pumps.....	62-63
Duplex feeder slate cut-out.....	427
Duplex pumps	66
Dynamo brushes	430

E

Economy of steam engines.....	477
Edison plug cut-outs.....	423
Edison wall sockets	419
Efficiency of shafting at different speeds, transmitting	488
Ejector, the H.D	247
Elastic tube cleaners	220
Electric meters	407
Electric power transmission.....	379
Electric railway	378
Electric tool grinder, portable	417
Electric units	377
Electrical equipment and supplies..	375 to 454
Elevator buckets	359
Elevator bucket bolts	359
Elevator bucket bolts for link belting....	360
Elevators, horse-power to drive oil mill..	487
Elevators, speed of oil mill.....	488
Elevators, sprocket chain	357
Elliptical tube cleaners, Christoffel.....	220
Emery grinding machines, Tompkins	158
Emery wheels	159
Enclosed arc lamps.....	395 to 397
Engines, economy of steam.....	477
Engine, horse-power of.....	477
Engine lubricators, plain	234
Engine lathe, improved 20-inch standard..	149
Engine repairs, Corliss	47
Engine, standard Corliss	48 to 53
Engine, slide valve	42-43
Engine, vertical	40-41
Engines, artesian well.....	68-69
Engines, automatic	44-45
Engines, boilers and appurtenances..	23 to 60
Engines, compound automatic	46
Engines, indicated horsepower of standard compound Corliss	52-53
Engines, table of horsepower of auto- matic	45
Engines, table of standard sizes of simple Corliss	49
Engineers' sets, oilers	243
Engineers' wrenches	230
Engineering and contracting.....	13 to 22
Equipment and supplies, electrical..	375 to 454
Equipment, hose house.....	100 to 102
Equivalents of various measures and weights	475
Eureka low pressure regulating valve....	248
Exhaust fans, patent steel	370
Exhaust heads	260
Expansion joint, iron body.....	191-192
Expansion steam trap, Tompkins	259
Expanders, tube	220
Extractor, multi-tubular oil and grease...	257
Extras, bar iron	285

F

Factory fire protection	93
Fans, bracket	394
Fans, ceiling	392-393
Fans, patent steel exhaust.....	370
Fans, separators and parts.....	371
Feed pump, automatic receiver.....	72
Feed pumps, capacities of boiler.....	474
Feed pumps, duplex boiler.....	62-63
Feed pumps, triplex boiler.....	64-65

Feed water heaters	38
Feeder, huller	304
Feeder slate cut-out, duplex.....	427
Fertilizer mixer	349
Filing machine	301
Filter presses.....	363-364
Filters, oil	259
Finished flange pulleys	138
Fire door fixtures	107
Fire hydrant, standard compression.....	104
Fire or indicator valves, special.....	106
Fire protection	93 to 110
Fire protection, factory.....	93
Fire pump, underwriters'.....	98-99
Fittings, cast iron.....	168 to 174
Fittings for meridian lamp	399
Fittings, fuse	425 to 427
Fittings, malleable.....	178 to 182
Fittings, pipe	147
Fixture cut-outs	421
Fixtures, fire door	107
Fixtures, full-arch front.....	26
Fixtures, regulator boiler	26
Flange couplings	115
Flanged pulleys, finished.....	138
Floor plates	185
Floor space required for textile machinery, approximate price, weight, H. P. and	480
Floor stands, ring-oiling ball and socket..	127
Floor stands, ring-oiling ball and socket heavy	126
Floors, cement and asphalt	466
Flue cleaners	219-220
Fluted steel porcelain enamel shade....	437
Foot push, combination	448
Forges, blacksmiths'	283
Former, cake	321
Frame, Tompkins drawing-in.....	462
Frame, Tompkins spinning	458
Frame railway track scales, iron.....	367
Friction of water in pipe.....	472
Fronts, boiler	36-37
Full-arch front boilers, settings for sta- tionary	30-31
Full-arch front fixtures	26
Fuse cut-outs, cartridge.....	423
Fuse fittings	425 to 427
Fuseless one-piece rosette, K. P.....	422
Fuses, standard	430

G

Gardner governors	54
Gas and water pipe, standard steam... 164-165	
Gas automatics, keys and mats for.....	454
Gas lighting apparatus	453-454
Gas pipe, cast iron water and.....	166-167
Gates, composition mounted, bell or spigot ends, iron body water.....	208
Gate valves, composition standard wedge..	204
Gate valves, hose end, composition wedge.	205
Gate valves, iron-body composition mounted double	206-207
Gauge cocks	232
Gauge columns, water	231
Gauge, gear pitch	144
Gauge, hydraulic or hydrostatic.....	261
Gauge, pressure or vacuum.....	260
Gauge syphons, steam	263
Gauges, water	233
G-E rosettes	421
Gear-cutting machine, improved hand....	153
Gear pitch gauge	144
Geared solid die stocks.....	223
Gearing	143
Generators and motors.....	380 to 384
Genuine Packer ratchet drills	219
Genuine Scotch glass tubes.....	232
Gin, No. 3 roller	467
Gins	372 to 374
Gins, cotton presses and.....	370
Ginning, cotton.....	368-369
Glass body oil pump.....	240

INDEX.

Glass insulators	435
Glass oil cup, Pioneer slide top	238
Glass oil cup, Royal sight-feed	239
Glass tubes, genuine Scotch	232
Glasses, cylindrical and urn-shaped.....	241
Governors, Gardner	54
Governors, the Pickering	55
Grate bars	39
Grease cup, Ideal automatic	237
Grease extractor, multi-tubular oil and...	257
Grinders, huller knife	306
Grinding machines, Tompkins emery	158
Grinder, portable electric tool.....	417
Grooved pulleys, sheaves or.....	139

H

Hack saws	231
Hack saw blades	231
Half-arch front boilers, settings for sta- tionary	27-28
Hand gear-cutting machine, improved hand	153
Hand taps, machinists	216
Hanger bolt	270
Hangers, pipe.....	182-183
Hangers, ring-oiling adjustable ball and socket line	122
Hangers, ring-oiling ball and socket head shaft	121
Hangers, ring-oiling ball and socket post..	123
H-D ejector, the.....	247
Head, exhaust	260
Head shaft hangers, ring-oiling ball and socket	121
Heat and steam.....	476
Heat regulators, automatic.....	87
Heaters, cooking	312 to 319
Heaters, feed water	38
Heating, house	80-81
Heating, steam and hot water.....	79 to 92
Heavy floor stands, ring-oiling ball and socket	126
Heavy waste press, new and.....	464
Hinged pipe vises	226
High pressure regulating valve.....	249
Hollow wood base switch.....	452
Hook plates	183-184
Horizontal return tubular stationary boiler	25-26
Horizontal separator, Cochrane.....	258
Horizontal turbine, sectional view of.....	78
Horse-power and floor space required for textile machinery, approximate price, weight	480
Horse-power of an engine.....	477
Horse power of automatic engines, table of	45
Horse power of standard compound Cor- liss engines	52-53
Horse-power to drive oil mill conveyors..	487
Horse-power to drive oil mill elevators...	487
Hose bibbs, compression.....	185
Hose end, composition wedge gate valves.	205
Hose house equipment.....	100 to 102
Hot water boilers	83
Hot water heating, steam and	79 to 92
House heating	80-81
Hull baling press, cotton seed.....	343-344
Hull packer, cotton seed.....	344
Hull separating screen meat and.....	307
Huller and separator, Tompkins.....	302
Huller and separator, plantation.....	305
Huller feeder	304
Huller knife grinders	306
Huller, Tompkins	302
Hydrant, standard compression fire.....	104
Hydraulic accumulators	336-337
Hydraulic packing for oil press.....	325
Hydraulic packing, mould for making.....	327
Hydraulic power pump.....	338
Hydraulic pumps	328-329
Hydraulic or hydrostatic gauge.....	261
Hydrostatic gauge, hydraulic or.....	261

I

Ideal automatic grease cup	237
Improved Collins compression couplings..	114
Improved damper regulator	256
Improved hand gear-cutting machine.....	153
Improved noiseless back pressure valve...	251
Improved positive driving drill chucks, Pratt's patent	210
Improved steam separator, New Century..	258
Improved 20-inch standard engine lathe..	149
Improved 20-inch national drill press ...	150
Improved 32, 36 and 42-inch standard drill presses	151
Improved 36-inch iron planer.....	152
Incandescent lamps.....	400 to 402
Incandescent lamps, opal shades for.....	436
Increase twist or constant angle straight shank drills	213
Increase twist drills, patent.....	212
Independent lathe chuck, Westcott's patent IXL.	209
Indicator posts	105
Indicator valves, special fire or.....	106
Indicators, speed	56
Information, useful	469-470
Ingall's tube cleaners	220
Injector, metropolitan automatic	246
Injector, universal double tube	244-245
Insulators, glass	435
Insulators, porcelain	434
Improved size kettle, Tompkins.....	463
Iron cocks, special.....	193-194
Iron cocks, standard.....	192-193
Iron couplings, wrought.....	182
Iron-body valves, standard.....	194 to 202
Iron-body valves, Jenkins Bros.....	190
Iron-body check valves.....	202-203
Iron-body composition mounted double gate valves	206-207
Iron-body water gates, composition mount- ed, bell or spigot ends.....	208
Iron extras, bar	285
Iron fittings, cast.....	168 to 174
Iron frame railway track scales.....	367
Iron planer, improved 36-inch.....	152
Iron pulleys, standard price list solid...	129 to 137
Iron set screws, case-hardened.....	272-273
Iron water and gas pipe, cast.....	166-167
Iron, weight per ft. of round and square.	286
Iron wood screws, patent.....	276
IXL independent lathe chuck, Westcott's patent	209

J

Jack screws	266
Jaw vises, patent adjustable.....	265
Jenkins Bros.' check valve.....	190-191
Jenkins Bros.' iron-body valves.....	190
Jenkins' standard '96 packing.....	209
Jenkins Bros.' valves.....	189 to 191
Jet condensers and air pumps, combined..	73
Jobbers' reamers	214
Joints, iron-body expansion.....	191-192

K

Kettle, Tompkins improved size.....	463
Keys and mats for gas automatics.....	454
Keyseaters	156
Knife grinders, huller	306
Knobs, wiring	433
K. P. fuseless one-piece rosette.....	422
K-W rosettes	421

L

Lag screws, wood or.....	271
Lap-welded boiler tubes, standard.....	163
Lamp cord and cables.....	432
Lamp, Meridian	398
Lamp, Meridian, fittings for.....	399

INDEX.

Lamps, enclosed arc..... 395 to 397
 Lamps, incandescent 400 to 402
 Lamps, incandescent, opal shades for..... 436
 Large O. D. pipe 164
 Lathe chuck, Westcott's patent IXL in-
 dependent 209
 Lathe, improved 20-inch standard engine.. 149
 Lighting apparatus, gas 453-454
 Lightning arresters 430
 Line hangers, ring-oiling adjustable ball
 and socket 122
 Link belting and attachments..... 358
 Link belting, elevator bucket bolts for.... 360
 Lint baling press 345
 Lining, conveyor 353
 Linter, cotton seed 300
 List solid iron pulleys, standard price...
 129 to 137
 Loom, yards of cotton cloth per..... 482
 Loose collars, steel 118
 Low pressure regulating valve, Eureka.. 248
 Lubricator, Detroit automatic sight-feed.. 235
 Lubricator, the Detroit sight-feed..... 236
 Lubricators, plain engine..... 234

M

Machine and car bolts..... 268-269
 Machine, filing 301
 Machine, portable boring 57 to 60
 Machine tools 147
 Machine, Tompkins band..... 461
 Machines, cotton seed delinating... 346 to 348
 Machines, pipe cutting and threading..
 221-222
 Machines, Tompkins emery grinding 158
 Machines, the Morse valve reseating.... 157
 Machinery, approximate price, weight, H.
 P. and floor space required for tex-
 tile 480
 Machinery, cotton seed oil mill.... 287 to 296
 Machinery, miscellaneous 457 to 467
 Machinery, power transmitting.... 111 to 146
 Machinery, pumping 61
 Machinists' Bull-Dog vises..... 265
 Machinists' hand taps 216
 Making hydraulic packing, mould for.... 327
 Malleable fittings..... 178 to 182
 Mats for gas automatics, keys and..... 454
 Meridian lamp 398
 Meridian lamp, fittings for 399
 Measures and weights, equivalents of
 various 475
 Measurements for setting stationary boilers
 with full-arch fronts..... 32
 Measurements for setting stationary boilers
 with half-arch fronts 29
 Meat and hull separating screen..... 307
 Men, boys and young..... 489 to 491
 Metal pushes, bronze stamped..... 446
 Metals, perforated 354
 Meters 405
 Meters, electric 407
 Metropolitan automatic injector 246
 Mill castings 465
 Mill conveyances, horse-power to drive oil 487
 Mill elevators, horse-power to drive oil.. 487
 Mill elevators, speed of oil..... 488
 Mill machinery, cotton seed oil.... 287 to 296
 Mill notes, oil 361-362
 Mill organizations, practical cotton.... 478-479
 Mill rules, cotton..... 485-486
 Mills, attrition..... 341-342
 Miscellaneous machinery 457 to 467
 Mixer, fertilizer 349
 Motors and generators 380 to 387
 Mould for making hydraulic packing.... 327
 Mounted double gate valves, iron-body
 composition 206-207
 Mule pulley stands 140
 Multi-tubular oil and grease extractor.... 257
 McLaughlin's steam tube cleaners..... 219

N

National drill press, improved 20-inch.... 150
 New and heavy waste press..... 464
 New books 492 to 494
 New Century improved steam separator .. 258
 Noiseless back-pressure valve, the Davis.. 254
 Noiseless back-pressure valves, improved.. 251
 Notes, oil mill..... 361-362
 No. 1 pressure regulator 320
 No. 2 pressure regulator..... 255
 No. 5 roller gin..... 467
 Nipples, wrought..... 177-178
 Nuts, cold punched 277

O

O. D. pipe, large..... 164
 Oil and grease extractor, multi-tubular... 257
 Oil cup, Pioneer slide top glass 238
 Oil cup, Royal sight-feed glass 239
 Oil filters 259
 Oil mill conveyors, horse-power to drive. 487
 Oil mill elevators, horse-power to drive.. 487
 Oil mill elevators, speed of..... 488
 Oil mill machinery, cotton seed.... 287 to 296
 Oil mills notes..... 361-362
 Oil presses..... 322 to 326
 Oil presses, hydraulic packing for..... 325
 Oil pump, glass body..... 240
 Oil refining 362
 Oilers, engineer's sets 243
 Oilers, steel 242
 One-piece rosette, K. P. fuseless..... 422
 One wire cleats 433
 Opal shades for incandescent lamps..... 436
 Openers, door 452
 Open-bottom portable boiler..... 34
 Operating pumps, directions for setting
 and 74-75
 Organizations, practical cotton mill.... 478-479
 Orton clutch 117

P

Packer, cotton seed hull..... 344
 Packer ratchet drills, genuine..... 219
 Packer taper socket ratchet drills..... 218
 Packing for oil press, hydraulic..... 325
 Packing, Jenkins' standard '96 209
 Packing, mould for making hydraulic.... 327
 Parts, fans, separators and..... 371
 Patent adjustable jaw vises..... 265
 Patent ceiling plates 185
 Patent cutters 154-155
 Patent improved positive driving drill
 chucks, Pratt's 210
 Patent increase twist drills..... 212
 Patent iron wood screws..... 276
 Patent IXL independent lathe chuck,
 Westcott's 209
 Patent pipe vise 226
 Patent steel exhaust fans..... 370
 Pear push button cord..... 450
 Pear-shaped push buttons 449-450
 Perforated metals 354
 Pickering governors, the..... 55
 Pillow blocks, rigid 125
 Pillow blocks, ring-oiling ball and socket 124
 Pioneer slide top glass oil cup 238
 Pipe and pipe fittings 147
 Pipe, cast iron water and gas..... 166-167
 Pipe cutters 227-228
 Pipe cutting and threading machines... 221-222
 Pipe covering, asbestos 162
 Pipe fittings and pipe..... 147
 Pipe hangers 182-183
 Pipe, large O. D..... 164
 Pipe, price list for cutting and threading.. 165
 Pipe, standard steam, gas and water... 164-165
 Pipe stocks and dies..... 224
 Pipe taps, reamers and drills..... 230
 Pipe tongs 229
 Pipe vise, hinged 226

INDEX.

Pipe vise, patent 226
 Pipe wrenches..... 228-229
 Pipes, friction of water in..... 472
 Pitch gauge, gear 144
 Plain engine lubricator 234
 Plain pulleys 128
 Planer, improved 36-inch iron..... 152
 Plantation huller and separator..... 305
 Plates, corner stones, tablets and advertising 468
 Plates, die 225
 Plates, floor 185
 Plates, hook 183-184
 Plates, patent ceiling 185
 Platform scales, portable square..... 366
 Plug cut-outs, Edison..... 423
 Plug cut-outs, 60-ampere 424
 Pop safety valves..... 262-263
 Porcelain enamel, fluted steel shade..... 437
 Porcelain insulators 434
 Portable boiler, open-bottom 34
 Portable boring machine..... 57 to 60
 Portable boiler, water-bottom..... 33
 Portable electric tool grinder..... 417
 Portable square platform scales..... 366
 Positive driving drill chucks, Pratt's patent improved 210
 Post hangers, ring-oiling ball and socket.. 123
 Posts, indicator 105
 Power of an engine, horse..... 477
 Power pump, hydraulic 338
 Power transmission 378
 Power transmission, electric..... 379
 Power transmitting machinery..... 111 to 146
 Practical cotton mill organizations....478-479
 Pratt's chucks, center arbors and taper split sleeves for 211
 Pratt's patent improved positive driving drill chucks 210
 Press cloth 364
 Press connections, pump and..... 330
 Press, cotton seed hull baling..... 343-344
 Press, hydraulic packing for oil..... 325
 Press, lint baling 345
 Press, new and heavy waste..... 464
 Press valves, automatic..... 331-332
 Presses 343 to 345
 Presses and gins, cotton 370
 Presses, filter 363-364
 Presses, improved 32, 36 and 42-inch standard drill 151
 Presses, oil 322 to 326
 Pressure or vacuum gauge 260
 Pressure regulating valve, Eureka low.... 248
 Pressure regulating valve, high..... 249
 Pressure regulating valve, Special '98 vacuum 250
 Pressure regulator, No. 1..... 320
 Pressure regulator, No. 2..... 255
 Pressure valve, improved noiseless back.. 251
 Pressure valve, the Davis noiseless back.. 254
 Pressure valves, semi-balanced back... 252-253
 Production table, ring spinning..... 481
 Properties of saturated steam..... 476
 Protection, factory fire..... 93
 Protection, fire 93 to 110
 Price list for cutting and threading pipe... 165
 Price list of regular wheels..... 160
 Price list solid iron pulleys, standard.. 129 to 137
 Price, weight, H. P. and floor space required for textile machinery, approximate 480
 Pulley stands, mule 140
 Pulleys, finished flanged 138
 Pulleys, plain 128
 Pulleys, sheaves or grooved..... 139
 Pulleys, standard price list, solid iron... 129 to 137
 Pump and press connection..... 330
 Pump, automatic receiver and feed..... 72
 Pump, deep well 68 to 71
 Pump, duplex 67
 Pump, glass body oil..... 240

Pump, hydraulic power 338
 Pump repairs 66
 Pump, underwriters' fire 98-99
 Pump valves 207
 Pumping machinery 61
 Pumps, capacities of boiler feed..... 474
 Pumps, combined jet condensers and air.. 73
 Pumps, direct connected 389
 Pumps, directions for setting and operating 74-75
 Pumps, duplex boiler feed 62-63
 Pumps, hydraulic 328-329
 Pumps, triplex boiler feed 64-65
 Punched nuts, cold 277
 Punched washers 278
 Push button cord, pear..... 450
 Push buttons, pear-shaped.....449-450
 Push buttons, wood..... 447-448
 Push, combination foot..... 448
 Pushes, bronze stamped metal..... 446

R

Radiator valves, standard..... 88 to 91
 Radiators 84 to 86
 Railway cut-outs, 500-volt..... 425
 Railway track scales, iron frame..... 367
 Railways, electric 378
 Ratchet, auger 219
 Ratchet, boiler 219
 Ratchet drills, genuine Packer 219
 Ratchet drills, Packer taper socket 218
 Reamers and drills, pipe taps 230
 Reamers, jobbers 214
 Reamers, shell 215
 Receiver and feed pump, automatic..... 72
 Receptable, the Chapman 420
 Recessed bearing, concealed collar..... 119
 Re-filing steel rolls 466
 Refining oil 362
 Reflectors and tin shades..... 436-437
 Regular boiler fixtures 26
 Regular wheels, price list of..... 160
 Regulating valve, Eureka low pressure... 248
 Regulating valve, high pressure..... 249
 Regulating valve, Special '98 vacuum-pressure 250
 Regulator, improved damper 256
 Regulator, No. 1 pressure..... 320
 Regulator, No. 2 pressure..... 255
 Regulators, automatic heat..... 87
 Repairs, Corliss engine 47
 Repairs, pump 66
 Reseating machines, the Morse valve..... 157
 Return tubular boilers, standard..... 24
 Return tubular stationary boiler, horizontal 25-26
 Reel, Tompkins 460
 Ribbed compression couplings 113
 Rigid pillow blocks 125
 Ring-oil bearings, directions for using... 120
 Ring-oiling adjustable ball and socket line hangers 122
 Ring-oiling ball and socket floor stands... 127
 Ring-oiling ball and socket head shaft hangers 121
 Ring-oiling ball and socket post hangers.. 123
 Ring-oiling ball and socket, heavy floor stands 126
 Ring-oiling ball and socket pillow blocks.. 124
 Ring spinning production table..... 481
 Ring spun warp yarn, table breaking strength 485
 Robinson's steam tube cleaners..... 219
 Rock drills and air compressors..... 284
 Roller gin No. 3..... 467
 Rolls, crusher 308 to 311
 Rolls, re-filing steel..... 466
 Rope, self-lubricating transmission..... 146
 Rope, wire 279
 Rosettes, G-E 421
 Rosettes, K-W 421
 Rosettes, K. P. fuseless one-piece..... 422
 Round and square iron, weight per foot of 286

INDEX.

Royal sight-feed glass oil cup 239
Rules, cotton mills.....485-486

S

Safety valve, pop..... 262-263
Sand and boll screens, Tompkins.... 298-299
Saturated steam, properties of..... 476
Saw blades, hack..... 231
Saws, hack 231
Scales 466
Scales, iron frame railway track..... 367
Scales, portable square platform..... 366
Scales, wagon 365
Scotch glass tubes, genuine..... 232
Screen, meat and hull separating..... 307
Screws, cap 274-275
Screws, case-hardened iron set..... 272-273
Screws, jack 266
Screws, patent iron wood..... 276
Screens, Tompkins sand and boll.... 298-299
Screws, wood or lag..... 271
Sectional view of horizontal turbine..... 78
Sectional view of vertical turbine..... 78
Seed cleaner, cotton 297
Seed delinting machines, cotton.... 346 to 348
Seed hull baling press, cotton..... 343-344
Seed hull packer, cotton..... 344
Seed linter cotton 300
Seed oil mill machinery, cotton.... 287 to 296
Self-lubricating transmission rope..... 146
Self-oiling bearings 120
Semi-balanced back pressure valve.... 252-253
Semi-porcelain and clay tubes..... 434
Separating screen, meat and hull..... 307
Separator, Cochrane horizontal 258
Separator, New Century improved steam. 258
Separator, plantation huller and..... 305
Separator, Tompkins huller and..... 303
Separators and parts, fans..... 371
Set screws, case-hardened, iron..... 272-273
Sets, oilers, engineers'..... 243
Setting and operating pumps, directions
for 74-75
Setting for stationary full-arch front boiler
..... 30-31
Settings for stationary half-arch front boilers
..... 27-28
Shade, fluted steel, porcelain enamel..... 437
Shades, opal, for incandescent lamps.... 436
Shades, tin and reflectors..... 436-437
Shaft hangers, ring-oiling ball and socket
head 121
Shafting at different speeds, transmitting
efficiency of 488
Shafting, price list 112
Shank drills, increase twist or constant
angle straight 213
Shcaves or grooved pulleys..... 139
Shell, reamers 215
Sight-feed glass oil cup, Royal 239
Sight-feed lubricator, Detroit automatic.. 235
Sight-feed lubricator, the Detroit..... 236
Simple Corliss engines, table of standard
sizes 49
Single bell chime whistles..... 264
Slate cut-outs, duplex feeder..... 427
Sleeves for Pratt's chucks, center arbors
and taper split..... 211
Sleeves, steel socket and..... 217
Slide top glass oil cup, Pioneer 238
Slide valve engines..... 42-43
Socket floor stands, ring-oiling ball and... 127
Socket head shaft hangers, ring-oiling ball
and 121
Socket heavy floor stands, ring-oiling ball
and 126
Socket line hangers, ring-oiling adjustable
ball and 122
Socket pillow blocks, ring-oiling ball and.. 124
Socket post hangers, ring-oiling ball and.. 123
Socket ratchet drills, Packer taper 218
Sockets and sleeves, steel..... 217
Sockets, Edison wall..... 419

Sockets, standard 418-419
Sockets, weatherproof 420
Soldering appliances 428-429
Solid die stocks, geared..... 223
Solid iron pulleys, standard price list..
..... 129 to 137
Space required for textile machinery,
approximate price, weight, H. P. and
floor 480
Speaking tube supplies..... 455
Special canvas-stitched belting..... 360
Special fire or indicator valves..... 106
Special iron cocks 193-194
Special '98 vacuum-pressure regulating
valve 250
Specialties, steam 147
Speed indicators 56
Speed of oil mill elevators..... 488
Speeds, transmitting efficiency of shafting
at different 488
Spinning frame, Tompkins 458
Spinning production table, ring..... 481
Split sleeves for Pratt's chucks, center ar-
bors and taper 211
Spooler, Tompkins 459
Springs, door and window.....450-451
Sprinklers 93
Sprinklers, automatic 103
Sprocket chain elevators..... 357
Spun warp yarn, table breaking strength
ring 485
Square iron, weight per foot of round and 286
Square platform scales, portable..... 366
Stamped metal pushes, bronze..... 446
Standard brass cocks..... 186-187
Standard brass valves..... 186 to 189
Standard compound Corliss engines, indi-
cated horse power of..... 52-53
Standard Corliss engines..... 48-53
Standard engine lathe, improved 20-inch.. 149
Standard fuses 430
Standard iron-body valves..... 194-202
Standard iron cocks..... 192-193
Standard lap-welded boiler tubes..... 163
Standard price list solid iron pulleys..
..... 29 to 137
Standard radiator valves..... 88 to 91
Standard return tubular boilers..... 24
Standard sections steel beams..... 142
Standard sizes of simple Corliss engines,
table of 49
Standard sockets 418-419
Standard steam, gas and water pipe.... 164-165
Standard wedge gate valves, composition.. 204
Standard '96 packing, Jenkins..... 209
Stands, mule pulley..... 140
Stands, ring-oiling ball and socket floor.. 127
Stands, ring-oiling ball and socket heavy
floor 126
Stationary boiler, horizontal return tubular
..... 25-26
Stationary boilers with full-arch fronts,
measurements for setting..... 32
Stationary boilers with half-arch fronts,
measurements for setting..... 29
Stationary full-arch front boilers, setting
for 30-31
Stationary half-arch front boilers, setting
for 27-28
Steam and heat..... 476
Steam and hot water heating..... 79 to 92
Steam boilers 82
Steam engines, economy of..... 477
Steam, gas and water pipe, standard.. 164-165
Steam gauge syphons 263
Steam, properties of saturated..... 476
Steam separator New Century improved.. 258
Steam specialties 147
Steam trap, Tompkins expansion..... 259
Steam tube cleaners, McLaughlin's..... 219
Steam tube cleaners, Robinson's..... 219
Steel beams, standard sections..... 142
Steel exhaust fans, patent 370

INDEX.

Steel fluted porcelain enamel shade.....	437
Steel loose collars	118
Steel oilers	242
Steel rolls, re-filing	466
Steel sockets and sleeves.....	217
Stitched belting, special canvas.....	360
Stocks and dies, pipe.....	224
Stocks, geared solid die.....	223
Stones, tablets and advertising plates, corner	468
Straight shank drills, increase twist or con- stant angle	213
Strength ring spun warp yarn, table breaking	485
Switch, hollow wood base.....	452
Switchboards	403-404
Switches	408
Supplies, electrical equipment and.....	375
Supplies, speaking tube	455
Syphons, steam gauge.....	263

T

Table breaking strength ring spun warp yarn	485
Table clamp	448
Table of areas of circles.....	473
Table of horse power of automatic en- gines	45
Table of standard sizes of simple Corliss engines	49
Table, ring spinning production.....	481
Tables relating to water.....	471
Tables, twist	483-484
Tablets and advertising plates, corner stones	468
Tank towers	108
Tanks	108 to 110
Tape and compound, commutator.....	428
Taper socket ratchet drills, Packer.....	218
Taps, reamers and drills pipe	230
Taps, machinists' hand	216
Textile machinery, approximate price, weight, H. P. and floor space required for	480
Tees, branch	175-176
The Chapman receptacle.....	420
The Davis noiseless back-pressure valve..	254
The H-D ejector	247
The Morse valve reseating machines	157
The Pickering governors	55
Threading machines, pipe cutting and..	221-222
Threading pipe, price list for cutting and..	165
Three and two wire cleats.....	433
Tighteners, belt	141
Time detector, watchman's.....	440
Tin shades and reflectors.....	436-437
Tool grinder, portable electric.....	417
Tools, machine	147
Tompkins band machine	461
Tompkins drawing-in frame	462
Tompkins emery grinding machines.....	158
Tompkins expansion steam trap.....	259
Tompkins huller	302
Tompkins huller and separator	303
Tompkins improved size kettle	463
Tompkins reel	460
Tompkins sand and boll screws	298-299
Tompkins spinning frame	458
Tompkins spooler	459
Tongs, pipe	229
Top glass oil cup, Pioneer slide	238
Tower, tanks	108
Track scales, iron frame railway.....	367
Transmission, electric power	379
Transmitting efficiency of shafting at dif- ferent speeds	488
Transmitting machinery, power....	111 to 146
Transmission, power	378
Transmission rope, self-lubricating.....	146
Trap, Tompkins expansion steam	259

Triplex boiler feed pumps.....	64-65
Triplex chain blocks.....	280
Tube boilers, water	35
Tube cleaners, Christoffel coil.....	220
Tube cleaners, Christoffel elliptical.....	220
Tube cleaners, clastic	220
Tube cleaners, Ingalls	220
Tube cleaners, McLaughlin's steam.....	219
Tube cleaners, Robinson's steam.....	219
Tube expanders	220
Tube injector, universal double	244-245
Tube supplies, speaking	455
Tubes, clay and semi-porcelain.....	434
Tubes, genuine Scotch glass.....	232
Tubes, standard lap-welded boiler.....	163
Tubular boilers, standard return.....	24
Tubular boiler, vertical.....	40-41
Tubular oil and grease extractor, multi...	257
Tubular stationary boiler, horizontal re- turn	25-26
Turbine, sectional view of horizontal....	78
Turbine, sectional view of vertical.....	78
Turbines	77
Twist drills, patent increase.....	212
Twist or constant angle straight shank drills, increase	213
Twist tables	483-484
Two and three wire cleats.....	433

U

Underwriters' fire pump.....	98-99
Units, direct connected.....	390-391
Units, electric	377
Universal couplings	116
Universal double tube injector.....	244-245
Urn-shaped glasses, cylindrical and.....	241
Useful information	469-470

V

Vacuum gauge, pressure or.....	260
Vacuum-pressure regulating valve, Special '98	250
Valve engine, slide	42-43
Valve, Eureka low pressure regulating....	248
Valve, high pressure regulating.....	249
Valve improved noiseless back pressure....	251
Valve, pop safety	263
Valve reseating machines, The Morse ..	157
Valve, semi-balanced back-pressure....	252-253
Valve, Special '98 vacuum-pressure reg- ulating	250
Valve, the Davis noiseless back-pressure..	254
Valves	147
Valves, automatic air	92
Valves, automatic change.....	333 to 335
Valves, automatic press.....	331-332
Valves, composition standard wedge gate..	204
Valves, hose ends, composition wedge gate	205
Valves, iron-body check.....	202-203
Valves, iron-body composition mounted double gate	206-207
Valves, Jenkins Bros.'.....	189 to 191
Valves, Jenkins Bros.' check.....	190-191
Valves, Jenkins Bros.' iron-body.....	190
Valves, pump	207
Valves, special fire or indicator.....	106
Valves, standard brass.....	186 to 189
Valves, standard iron-body	194 to 202
Valves, standard radiator.....	88 to 91
Various measures and weights, equiva- lents of	475
Vats and cisterns.....	110
Vertical engine.....	40-41
Vertical tubular boilers.....	40-41
Vertical turbine, sectional view of.....	78
Vise, hinged pipe.....	226
Vise, patent pipe	226
Vises, patent adjustable jaw.....	265
Vises, machinists' Bull-Dog	265
Volt railway cut-outs, 500	425

INDEX.

W

Wagon scales	365
Wall sockets, Edison.....	419
Warp yarn, table breaking strength ring..	485
Washers, punched	278
Waste press, new and heavy.....	464
Watchman's time detector.....	440
Water and gas pipe, cast iron.....	166-167
Water boilers, hot.....	83
Water-bottom portable boiler.....	33
Water gauge	233
Water gauge columns.....	231
Water heaters, feed	38
Water heating, steam and hot.....	79 to 92
Water in pipes, friction of.....	472
Water pipe, standard steam, gas and..	164-165
Water, tables relating to.....	471
Water tube boilers	35
Water wheels	76
Weatherproof sockets	420
Wedge gate valves, hose ends, composition	205
Weights, equivalents of various measures and	475
Weight, H. P. and floor space required for textile machinery, approximate price	480
Weight per foot of round and square iron	286
Well engines, artesian.....	68-69

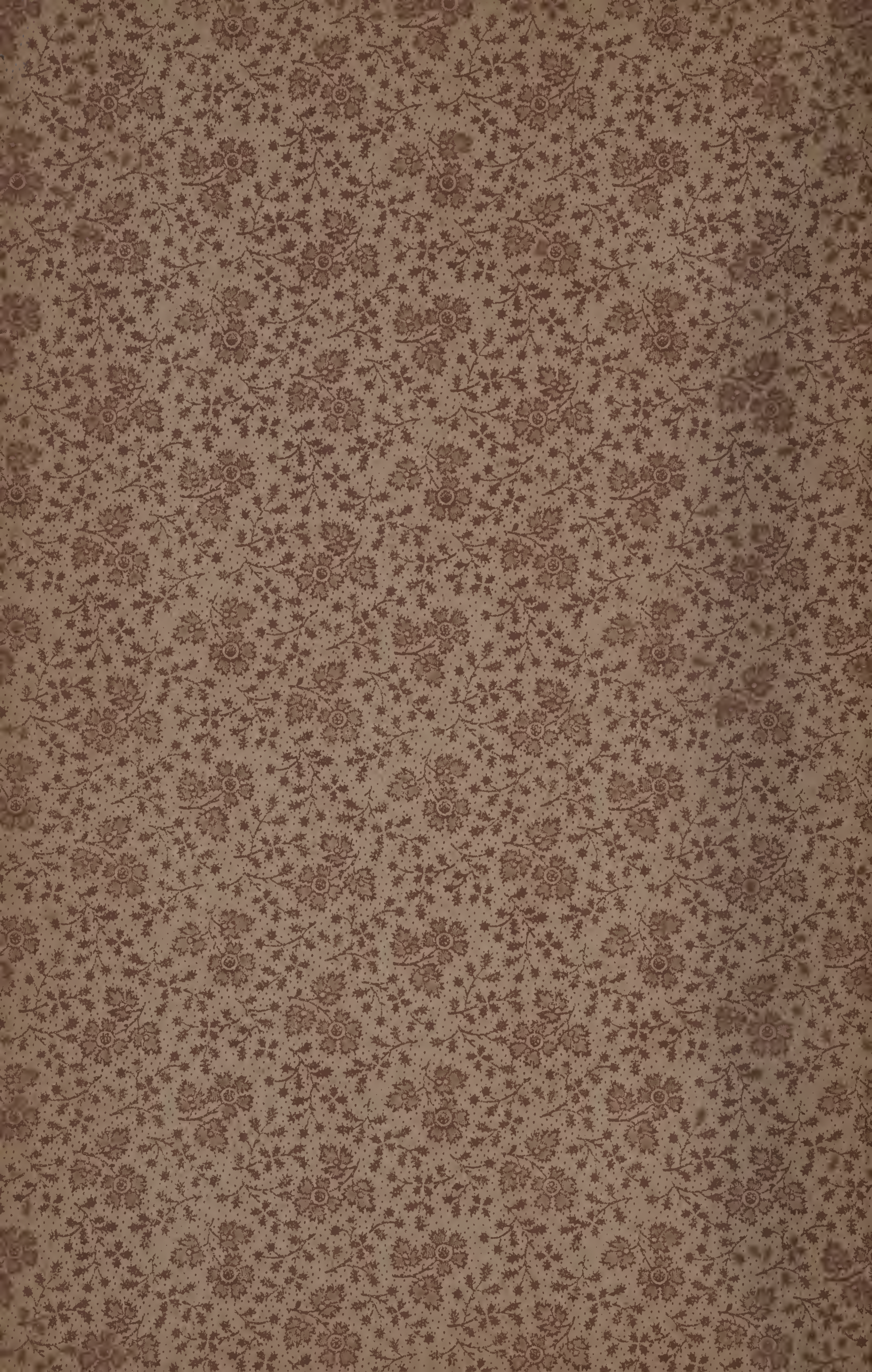
Well pump, deep.....	68 to 71
Westcott's patent IXI, independent lathe chuck	209
Wheels, emery	159
Wheels, price list of regular.....	160
Wheels, water	76
Whistles	455
Whistles, single bell chime.....	264
Window springs, door and.....	450-451
Wire	431
Wire cleats, one.....	433
Wire cleats, two and three.....	433
Wire rope	279
Wiring knobs	433
Wood base switch, hollow.....	452
Wood or lag screws.....	271
Wood push buttons.....	447-448
Wood screws, patent iron.....	276
Wrenches Baxters "S".....	230
Wrenches, Coes	230
Wrenches, engineers'	230
Wrenches, pipe.....	228-229
Wrought iron couplings.....	182
Wrought nipples	177-178

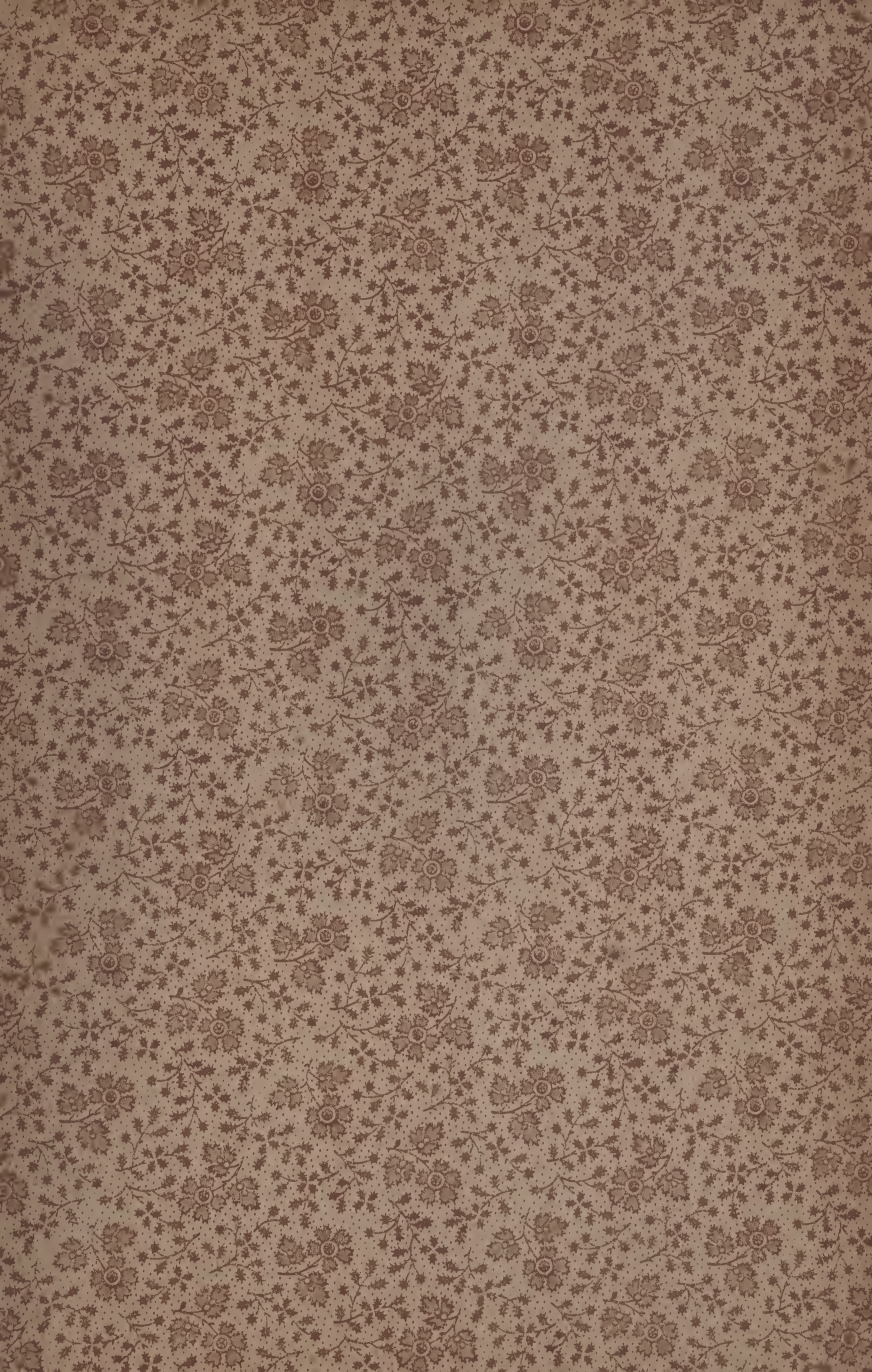
Y

Yards of cotton cloth per loom.....	482
Yarn, table breaking strength ring spun warp	485
Young men and boys.....	489 to 491



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